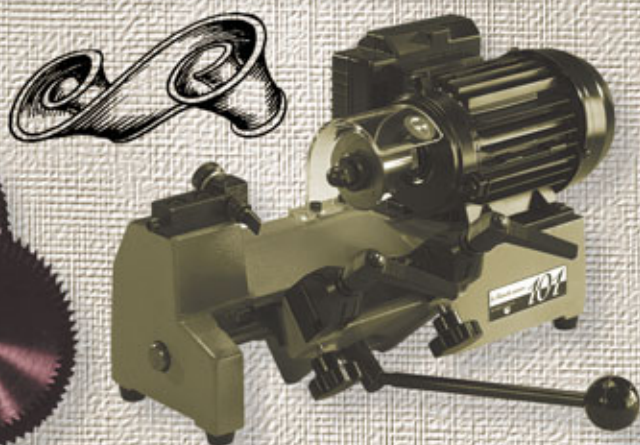


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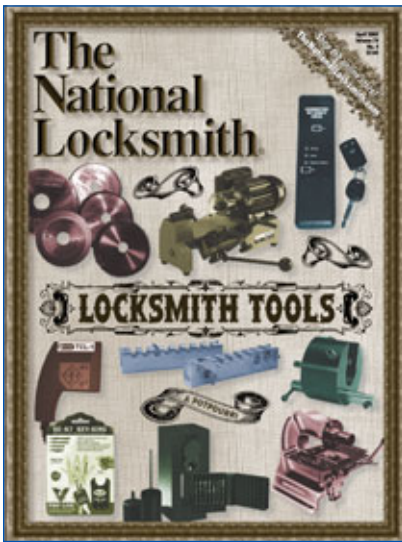
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On The Cover...



Who doesn't love tools! This month we cover the latest offerings by some of our favorite companies that is sure to spark your interest and guaranteed to make your daily service practices easier.

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COMMENTARY



Lock Picks for Everyone!

Joe Larkin, Public Communications Director of the National Safety Council advises citizens, "Take an inventory of your home safety items so that you can be prepared to battle any emergency. You'll find that the items listed below are all essential to your family's safety."

Number ten on the National Safety Council's list of must-have items are deadbolts.

Here's the text of the announcement:

"Put a deadbolt lock on every entrance to your home. Ask the locksmith for a deadbolt lock that's pick- and drill-proof. Such locks start at \$150. Invest in sturdy doors; a good lock doesn't serve its purpose on a flimsy door. Another lock that's important is one for your gun cabinet. Always lock your gun, if you have one, and lock up your ammunition separately from your gun."

It's refreshing to see locksmiths listed as the source for better home security, versus the retail home center's version of these locks. While we might have suggested the term "pick resistant" over "pick proof," we still agree with the concept that homeowners should know the difference between the \$15 lock and the \$150 lock.

This year, in fact, this month, is my twenty year anniversary here at *The National Locksmith* as your publisher. I can hardly believe that I am old enough to have had a career of this length, but hey, I was only a kid when I got here anyway.

But when I look back over the 240 issues of this magazine that I have overseen, I see that keeping lock picking "secrets" away from the public has been one of the hottest topics, along with (yawn) police and car openings.

Guys, it's the year 2003 now, in the 21st Century. It's time for us to deal with the fact that LOCK PICKING IS NOT A SECRET!

A few years ago when I did an internet search on the term "lock pick," over 7,000 results were returned. Today, however, when I did the same

search on Google, the results which were returned in 0.07 seconds numbered 928,000!

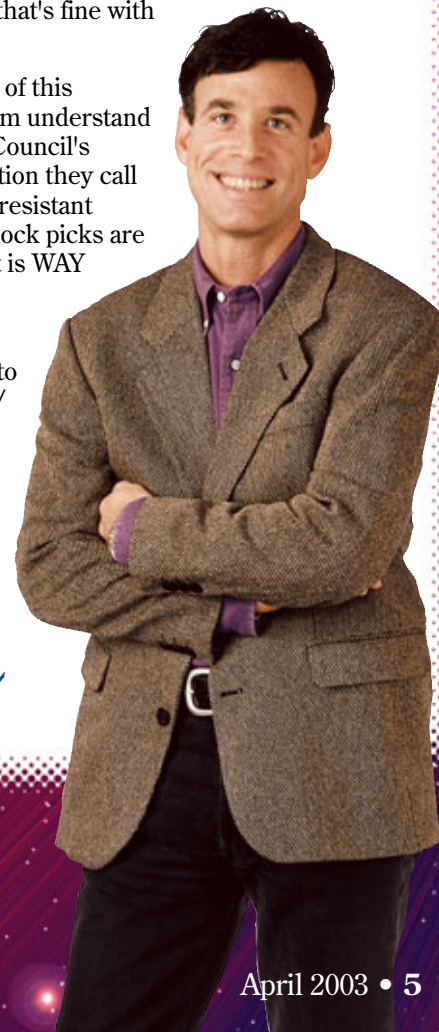


Site after site listed books, picks, pick guns, and electronic pick guns for sale to almost anyone. As for the law ALOA sponsored against mailing picks to anyone who is not a bona fide locksmith, Google's top site says that anyone who orders from the site automatically certifies that they are a bona fide locksmith. That means they sell and ship to anyone.

Should we be protesting? Writing letters to the editor? Throw a Million Locksmith March on Washington DC? Hell no! We should be promoting these facts to our customers, and helping them understand that the average home center lock just isn't good enough any more. Any 12 year old with America Online can learn to pick locks now, and that's fine with me.

Inform the public of this danger, and help them understand the National Safety Council's (NSC) recommendation they call a locksmith for pick resistant deadbolts. After all, lock picks are everywhere. The cat is WAY out of the bag.

To read the NSC item about locks go to <http://www.nsc.org/issues/firstaid/22items.htm>.



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Marc Goldberg
Publisher

Mango's Message

Master Key Vulnerabilities Revealed, Part 2 *Discovering The Master Key.*

Last month I presented the "Master Key Copying Revealed" article by John Schwartz that was published in The New York Times newspaper on January 23, 2003. In it you learned that Mr. Matt Blaze was the primary source of information for the article. Mr. Blaze was selected in part due to a research paper he wrote titled, *Cryptology and Physical Security: Rights Amplification in Master-Keyed Mechanical Locks*, which is available on the Internet. This month you will learn who Mr. Blaze is and his procedure for producing a mechanical pin tumbler lock master key as outlined in his research paper. The entire 7,092 word 12-page document follows.

Cryptology and Physical Security: Rights Amplification in Master-Keyed Mechanical Locks

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PREPRINT: 15 Sept 2002 (revised 12 Feb 2003). A version of this paper will appear in IEEE Security and Privacy, March/April 2003. The URL for this document is <http://www.crypto.com/papers/mk.pdf>

Abstract

This paper examines mechanical lock security from the perspective of computer science and cryptology. We focus on new and practical attacks for amplifying rights in mechanical pin tumbler locks. Given access to a single master-keyed lock and its associated key, a procedure is given that allows discovery and creation of a working master key for the system. No special skill or equipment, beyond a small number of blank keys and a metal file, is required, and the attacker need engage in no suspicious behavior at the lock's location. Countermeasures are also described that may provide limited protection under certain circumstances. We conclude with directions for research in this area and the suggestion that mechanical locks are worthy objects for study and scrutiny.

1. Introduction

In the United States and elsewhere, mechanical locks are the most common mechanisms for access control on doors and security containers. They are found in (and guard the entrances to) the vast majority of residences, commercial businesses, educational institutions, and government facilities, and often serve as the primary protection against intrusion and theft.

As important as locks are in their own right, their design and function has also influenced much of how we think about security generally. Computer security and cryptology borrow much of their language and philosophy from metaphors that invoke mechanical locksmithing. The concept of a "key" as a small secret that allows access or operation, the notion that system security should be designed to depend only on the secrecy of keys, and even the reference to attackers as "intruders," can all be traced back to analogies that long predate computers and modern cryptology.

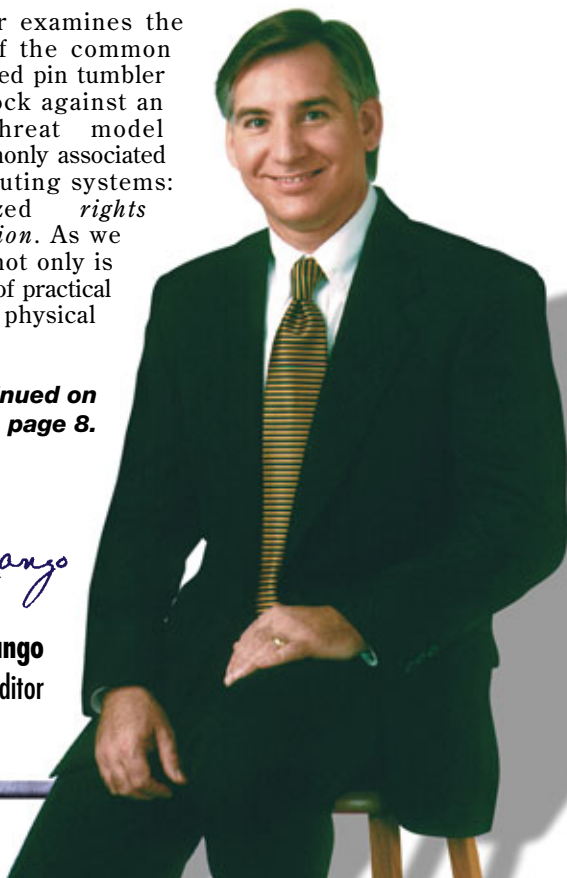
Conversely, the design of mechanical locks could well be informed by the philosophy and methodology of computer security and cryptology. For example, formal notions of the computational complexity and other resources required to attack a system could be applied to the analysis and design of many aspects of mechanical locks. In general, however, these concepts have not enjoyed widespread adoption by locksmiths or lock designers. Computer security specialists, for their part, are often surprisingly unskeptical in evaluating claims of physical security.

This paper examines the security of the common master-keyed pin tumbler cylinder lock against an insider threat model more commonly associated with computing systems: *unauthorized rights amplification*. As we shall see, not only is this threat of practical concern in physical

**Continued on
page 8.**



Greg Mango
Editor



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Continued from page 6

security, there are simple attacks that render many real-world lock systems quite vulnerable to it.

2. Background: Mechanical Locks

A complete review of lock technology is well beyond the scope of this paper. For an excellent discussion of physical security design and evaluation, the reader is referred to "Locks, Safes and Security" by M. W. Tobias, Charles Thomas Publisher, Ltd. Springfield, IL, USA. 2000. For the purposes of consistent terminology, a brief overview follows.

Broadly speaking, mechanical locks fall into two general categories: *combination* locks, which operate upon demonstration of a secret procedure, and *keyed* locks, which operate with use of a secret token. Combination locks are most frequently used to control access to safes and vaults and on some padlocks; most commercial and residential doors and entrances use keyed locks.

There are many different keyed lock designs that have been invented and used throughout the industrial age; among currently manufactured schemes there are *warded* locks, *lever tumbler* locks, *disk tumbler* locks, *rotary tumbler* locks, and *dimple key* locks. More recently, electronic locks and computer-based access control systems have found application in some commercial environments. By far the most common medium- and high-security mechanical keyed lock mechanism in the U.S. and many other countries, however, is the mechanical *pin tumbler* lock cylinder.

2.1. Evaluating Lock Security

Mechanical locks must resist a much wider range of threats than those associated with computing or communications systems.

First, of course, locks function in the physical world and must therefore be sufficiently mechanically strong to withstand forceful attack. Evaluation of this aspect of lock security focuses on such issues as the strength of materials, the accessibility of weak points, resistance to various tools, and so forth. There are industry and government standards that require specific physical characteristics of locks for various applications, which vary depending on the expected resources of the attacker and the likely ease of alternative methods of entry (e.g., through a broken window).

A related issue is the ease with which the locking mechanism itself can be bypassed. It may be possible to open a lock without interacting with the keyed mechanism at all: door latches can often be wedged or pried open, for example. Here, security depends not only on the lock but also the soundness and correctness of its installation.

It is also possible that a lock might be manipulated to operate without a key or that a key can be fabricated without knowledge of its parameters. The most common (or at least famous) manipulation method involves *picking*, which exploits small manufacturing imperfections and mechanical tolerances to set a lock to a

keyed state without using a key. A related method, *impressioning*, fabricates a working key directly. Manipulation is generally non-destructive and may leave behind only minimal external evidence. Both picking and impressioning require finesse and skill, however, and are much more difficult to carry out against locks of better quality, especially designs that employ security features intended specifically to thwart manipulation.

Evaluating and protecting against most of the above threats focuses more on the details of a lock's mechanical and physical construction than on abstractly quantifiable security metrics. A computer science and cryptologic security analysis, on the other hand, might take a more abstract, idealized view of locks and their operation. In particular, we might be especially concerned with the security of the key space against various threats.

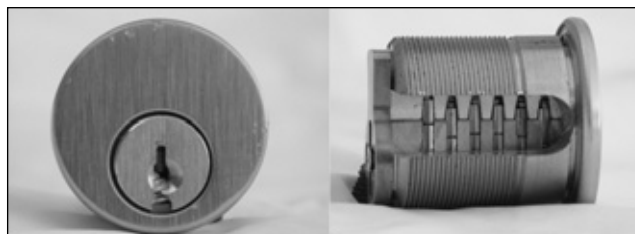
The most basic design goal of all keyed locks is that a correct key is required for operation; ideally, it should not be possible to operate a lock without possession of the key. (This is rarely achieved in practice due to the factors discussed above, but that is not critical for the purposes of this discussion). Among the most quantifiable security parameters for discussing locks, therefore, is the number of possible unique keys (called the number of *differs* or *changes* in the terminology of the trade), which gives the probability that a randomly cut key will operate a given lock and an upper bound on the resources required to find a working key by exhaustive search. On typical commercial locks, there are between several thousand and several million possible distinct keys. While these numbers may seem very small by computational security standards, mechanical locks perform on a more human scale. Testing a key against a lock, after all, is an "online" operation requiring seconds, not microseconds, and carries with it at least some risk of discovery if the lock is not one to which the attacker has legitimate access.

If exhaustive search is not feasible, it may still be possible to analyze and exploit a lock's key space in other ways.

2.2. The Pin Tumbler Lock

The modern pin tumbler lock is quite simple, dating back to ancient Egypt but not commercially mass-produced until the middle of the 19th century. The basic design consists of a rotatable cylinder tube, called a *plug*, that operates the underlying locking mechanism. Around the circumference of the plug is a *shell*, which is fixed to the door or container. Rotation of the plug within the shell operates the locking mechanism. In the locked state the plug is prevented from rotating by a set of movable *pin stacks*, typically under spring pressure, that protrude from holes in the top of the opening in the shell into corresponding holes drilled into the top of the plug. Each pin stack is *cut* in

one or more places perpendicular to its length. (See figure 1.) (In practice, the cuts are produced by stacking pin segments of particular sizes, not by actually cutting the pins; hence the term "pin stack.")



1. A pin tumbler lock cylinder. Left: The cylinder face. Note the keyway, which is cut into the plug, which in turn sits inside the shell. Right: Side view, with part of the shell and plug cut away to expose the six pin stacks. Note the border between the plug and shell, which forms the shear line, and the cuts in each pin stack resting within the plug.



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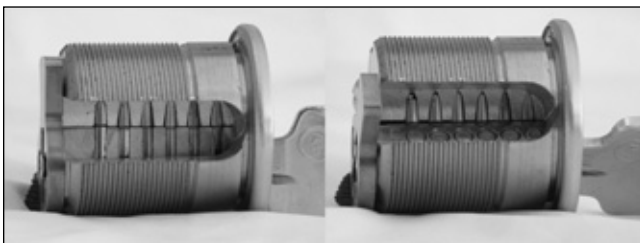


Continued from page 8

With no key in the lock, all the pin stack cuts rest within the plug. When a key is inserted into the *keyway slot* at the front of the plug, the pin stacks are raised within the plug and shell. The plug can rotate freely only if the key lifts every pin stack's cut to align at the border between the plug and shell. The plug/shell border is called the *shear line*. (See figure 2.) The plug will be blocked from rotating if any pin stack is lifted either not far enough (with the cut still in the plug below the shear line) or too far (with the cut pushed above the shear line and into the shell); to rotate, all pin stacks must have a cut at the shear line. (See figure 3.) The height (or *cut depth*) of a key under each pin stack position is called its *bitting*; the

bitting of a key is the "secret" needed to open a lock. A key that is bitted to the wrong depth in even one pin position will not allow the lock to operate.

Generally, a lock manufacturer will choose from among only a small number of standard bitting depths at each pin position. This allows keys to be described concisely: typically, the bitting depth number is written starting from the shoulder (handle) of the key to the tip, giving the standard depth number at each position. So a key for a five pin lock denoted



2. Pin tumbler lock with a correct key inserted. Left: The correct key lifts the pin stacks to align the cuts at the shear line. Right: With all of the cuts at the shear line, the plug can rotate freely within the shell. Here the plug has been turned slightly toward the camera, so that the tops of the pins in the plug are visible.



3. A lock with an incorrect key. Observe that while three of the pin stacks' cuts are at the shear line, two stacks have the cut too high and one stack has the cut too low.

"12143" would be cut to depth "1" nearest the shoulder, and proceeding toward the tip cut at depths "2," "1," "4," and "3." (The exact specifications of the depths and positions for most commercial locks are widely published in the trade or could be discovered easily by disassembling a sample lock or measuring a small number of cut keys.) Typically, the number of pins is in the range of four to seven, and the number of possible depths ranges from four to ten, depending on the lock model. Better quality locks generally employ

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Mango's Message

more pins and use more distinct cut depths on each.

Pin tumbler locks can often be defeated in various ways, although a discussion of lock picking and other bypass techniques that require specialized skills or tools or that exploit mechanical imperfections is beyond the scope of this paper. In practice, however, even very modest products are often sufficiently secure (or offer the perception of being sufficiently secure) to discourage the more casual would-be intruder from attempting to operate a lock without a key. Probably the most commonly used techniques for unauthorized entry, aside from brute force, involve procuring a working key.

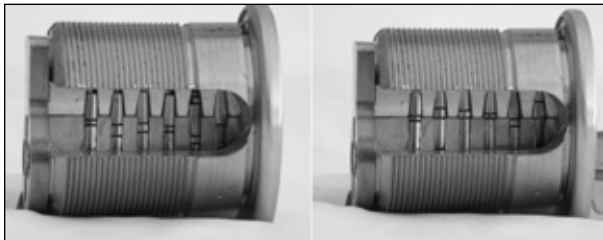
2.3. Master Keying

Complicating the analysis of pin tumbler lock security is the fact that, especially in larger-scale installations, there may be more than one key bitting that operates any given lock. The most common reason for this phenomenon is the practice of *master keying*, in which each lock in a group is intended to be operated not only by its own unique key (the *change key* in trade parlance) but also by "master" keys that can also operate some or all other locks in the system.

Master keying in pin tumbler locks can be accomplished in several ways, with the earliest systems dating back over 100 years. The conceptually simplest master key method entails two cylinders on each lock, one keyed individually and the other keyed to the master bitting; a mechanical linkage operates the lock when either cylinder is turned. Other master keying schemes employ an independently keyed *master ring* around the lock core, and still others depend on only a subset of pin positions being used in any given lock. All of these approaches have well-known advantages and disadvantages and are not considered in this paper. Most importantly, these schemes require the use of special locks designed specifically for master keying.

The most common master keying scheme - the subject of

consideration of this paper - can be used with virtually any pin tumbler lock. Recall that in a pin tumbler lock, each pin stack is cut in one place, defining exactly one depth to which the stack must be lifted by the key bitting to align with the shear line. In the conventional *split pin* mastering scheme, some or all pin stacks are cut in more than one place (typically in two places), allowing additional bittings that align such pins. (See figure 4.)



4. A master keyed pin tumbler lock. Left: Each of the six pin stacks has two cuts. Right: With the correct change key inserted, one of the cuts on each pin stack is aligned at the shear line. Observe that the other cut is sometimes above and sometimes below the shear line.

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Consider for example, a lock “A,” which has five pin stacks with four possible cut positions in each. Suppose pin stacks 1 through 5 are each cut in two places, corresponding to bittings “1” and “4”. Observe that this lock can be opened by at least two keys, one with bitting 11111 and another with bitting 44444. We could create a second lock “B,” this time with pin stacks 1 through 5 each cut at depth “2” and depth “4”. This lock can be operated by keys cut 22222 and 44444. If these are the only two locks in the system, keys 11111 and 22222 can be said to be the change keys for locks “A” and “B,” respectively, while key 44444 is a master key that operates both.

There are a number of different schemes for master keying; the subject is surprisingly subtle and complex, and the trade has developed standardized practices in recent years. For in-depth treatments, the reader is referred to J. Andrews “Fundamentals of Master Keying,” available from Associated Locksmiths of America and B.B. Edwards Jr. “Master Keying by the Numbers,” available from Lockmasters Inc.

For the purposes of our discussion, it is sufficient to note that modern split-pin master systems fall into two broad categories: *Total Position Progression (TPP)* and *Rotating Constant (RC)*. In TPP schemes, every pin stack has a single separate master cut, which is never used in that position on any change keys. In RC schemes, change keys do share the master bitting for a fixed number of pin stack positions, although the positions will vary (rotate) from lock to lock. Both these schemes can implement a directed graph with several levels of master keys: “sub-master” keys that open a subset of locks in the system and “grand master” keys that open more. *There are also Selective Key systems, in which any lock can be keyed to operate with an arbitrary subset of keys, using techniques similar to master keying, and Maison Key schemes, in which certain locks are keyed to all keys in a group. We do not consider such systems here.* The highest-level master key, which opens all locks in a multi-level system, is sometimes called the Top Master Key (TMK).

The astute reader will note that master keying reduces security in several important ways. First, of course, the master key represents a very valuable target; compromise of the master key compromises the entire system. Even if the master keys are well protected, security is still somewhat degraded. Because each mastered pin stack aligns with the shear line in several positions, mastered systems are more susceptible to *cross keying* and *unintentional key interchange*, in which keys from the same or other systems operate more locks than intended. For the same reason, mastered locks tend to be more vulnerable to manipulation by picking and impressioning. These weaknesses can be mitigated to some extent through careful planning, improved mechanical construction, and the use of additional pin stacks and possible cut depths.

In this paper, however, we consider methods for discovering the master key bitting in conventional pin tumbler systems given access to a single change key and its associated lock. No special skills or tools are required on the part of the attacker, nor is it necessary to disassemble any lock or engage in any inherently conspicuous or suspicious activity. We also suggest countermeasures and alternative lock designs that can frustrate these attacks to at least some extent under certain circumstances.

3. Rights Amplification: Reverse-Engineering Master Keys

Clearly, the most valuable, sensitive secret in any lock system is the bitting of the top-level master key (TMK). Insiders, who possess legitimate change keys and have physical access to locks, represent perhaps the most serious potential threat against master keyed systems. The primary purpose of assigning locks unique change key bittings, after all, is to allow operating privileges to be granted to only specific locks; if a change key can be converted into a master key, a major security objective of the system is compromised. In the terminology of computer security, master key systems should resist unauthorized *rights amplification* (also called *privilege escalation*). Unfortunately, most deployed master key systems are quite vulnerable in this regard.

3.1. Background

Several time-honored methods convert change keys into master keys, with different techniques applicable depending on the particular system and resources available to the attacker.

The simplest approach to master key discovery involves direct decoding of an original master key, e.g., from visual inspection, photographs, photocopies, or measurement. A trained observer may be able to recall the cut depths with surprising accuracy after being allowed to look only briefly at a key.

Another direct technique involves disassembly of a master keyed lock and measurement of the pins in each pin stack to determine the bittings that will operate each pin position. Without access to the lock's change key, this does not yield complete information about the master bitting; there will be exponentially many potential master key bittings, only one of which will correspond to the true master key. If every pin is mastered according with a standard TPP scheme, disassembly of a single lock will reveal “ 2^P ” potential master keys, where “ P ” is the number of pin stacks. (This exponent is still small enough to make exhaustive search of these keys feasible in many cases). Disassembly of additional locks from the same system can narrow this search space significantly. If the change key to a disassembled lock is available, the cuts corresponding to its bitting can be eliminated from each pin stack, making the correct bitting of the true master unambiguously clear from a single sample. (More secure lock designs make it difficult to non-destructively remove a lock without the key, e.g., by placing set screws in locations that are inaccessible when a door is closed and locked). Padlocks are especially vulnerable to these sorts of attacks, since they can be stolen easily when they are left unlocked.

A sufficiently large group of change key holders in TPP-based systems may be able to reverse engineer a master key without disassembling any locks. Recall that in these systems change keys never have the same bitting at a given pin position as the master. By measuring their change keys, a conspiracy of key holders may discover a single depth not used at each pin position on the change keys; this will correspond to the master bitting. Several correspondents have noted that this technique is occasionally employed by enterprising university students, especially at better engineering schools.

None of these approaches is completely satisfactory from the point of view of the attacker, however. Direct decoding from the true master key entails limited access to such a key and is



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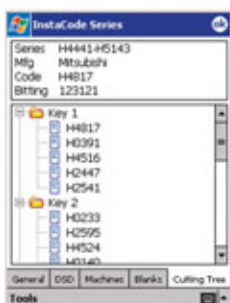
All space and depth information is displayed in your choice of inches or millimeters.

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Select "Blanks" and get a comparative cross reference. This gives you the matching blank for your preferred key numbering system.

Only got a part of a bitting? Enter the known information in "Find Bitting." The program finds the missing information.



An on screen Cutting Tree helps eliminate key blank waste.

Continued from page 12

not possible if no master key is available for measurement. Lock disassembly for pin measurement may expose the attacker to suspicion and could be difficult to perform in secret (and carries the risk that the lock may be damaged in reassembly). Comparing a large number of different keys requires, in the first case, a large number of different keys, which may not be available, and is ineffective against RC-based systems.

A more powerful attack requires only one change key and is effective against all standard TPP- and RC- based systems.

3.2. An Adaptive Oracle-Based Rights Amplification Attack

It is useful now to consider a lock in more abstract terms. From a cryptologic point of view, we might observe that a lock is really an online “oracle” that accepts or rejects keys presented to it. In this sense, the oracle gives a single bit answer for each key presented to it; the lock either turns or it does not.

A natural question to ask about any online oracle is whether it is feasible to issue a small number of queries that force the oracle to leak its secrets. In particular, can we exploit the oracle to test efficiently single “bits” of a possible key or must we exhaustively search the entire key space?

Recall that a pin tumbler lock will operate when each of its pin stacks is raised (by a key) to a position where one of its cuts is aligned at the shear line. There is no “communication” among pins; the lock will operate not only with all pin stacks aligned at the change key depth or all pin stacks at the master key depth, but also by keys that align some stacks at the change depth and others at the master depth. That is, consider our five pin lock “A” from the previous section, with key bitting 11111 representing “A’s” change key and 44444 representing the system’s master key. This lock can be operated not only by the obvious keys cut 11111 and 44444, but by a total of “2 5” different keys, including, e.g., 11114, 11141, etc.

It is straightforward to exploit this phenomenon to discover the master key bitting given access to a single change key and its associated lock, plus a small number of blank keys milled for the system keyway.

In our new attack, we use the operation or non-operation of a lock as an “oracle” to determine, pin by pin, the complete bitting of the TMK.

It is always difficult to be sure that something is novel in the sense of not having previously been discovered independently; the lack of a coherent and open body of literature on locks makes it especially so here. Our attack surely is not new in this sense. Several correspondents have suggested that similar approaches to master key reverse engineering have been discovered and used illicitly in the past and the method occasionally circulated informally, e.g., on Internet message boards. We subsequently found a message originally sent to a private mailing list in 1987 from Doug Gwyn that describes a similar method. However, there do not appear to be references to this particular attack in the published literature of either the locksmith or underground communities.

3.2.1. Notation

Let “ P ” denote the number of pin stacks in a lock, with stack “1” representing the first stack (e.g., the one closest to the

shoulder of the key) and stack “ P ” representing the last (e.g., the stack at the tip of the key).

Let “ D ” denote the number of distinct key bitting depths in a pin stack, where 1 is the highest bitting (in which the pin stack is raised the most) and “ D ” is the lowest (in which the pin stack is raised the least).

Assuming that the physical properties of the system place no restrictions on the bitting depth of adjacent pin positions, observe that the number of distinct keys is “ $D P$ ”.

3.2.2. The Attack

For each pin position, “ p ” from 1 to “ P ”, prepare “ $D-1$ ” test keys cut with the change key bitting at every position except position “ p ”. At position “ p ”, cut each of the “ $D-1$ ” keys with each possible bitting depth *excluding* the bitting of the change key at that position. Attempt to operate the lock (“query the oracle”) with each of these test keys, and record which keys operate the lock.

In a TPP-based system with every pin mastered, exactly one of the “ $D-1$ ” test keys for each pin position will operate the lock; the depth of the test key at that position represents the master bitting at that position. If none of the test keys for a particular position operates the lock, then either that pin is not mastered or it is an RC-based system. In either of these cases, the master key bitting at that position is the same as that of the original change key.

Once the master bitting has been determined at each of the “ P ” positions, a complete top-level master key can be cut easily.

Observe that our attack consumes “ $P(D-1)$ ” key blanks and requires “ $P(D-1)$ ” probes of the lock, in the worst case. If it is possible for the attacker to cut keys between probes of the lock, however, a simple optimization reduces the number of blanks consumed to “ P ” in the worst case. Rather than cutting “ $D-1$ ” separate blanks per position, the attacker need use a single key, initially cutting the position under test to the highest depth and re-cutting the same blank successively lower after probing the lock. This reduces the total cost of carrying out the attack to less than about two US dollars in the worst case. This optimized attack still requires “ $P(D-1)$ ” probes of the lock in the worse case, of course.

3.2.3. Practical Considerations

In some lock designs, not all of the “ $D P$ ” possible keys are “legal”. In particular, with some lock models it is not possible on a standard key to have a very high cut immediately adjacent to a very low cut if the angle at which the bittings are cut reaches across to the next pin position. A lock’s *Maximum Adjacent Cut Specification* (MACS) might require, for example, in a system with 7 different cut depths that adjacent cuts be no more than 4 steps apart, disallowing a depth “1” cut next to a depth “7” cut. Even if both the change key and the master key do not violate the MACS rule for a particular lock, this attack employs test keys that mix change key cuts with potential master cuts. If the original change key has very high or very low cuts, it may therefore be necessary for the attacker to create some test keys that do violate MACS. In practice, on the locks we examined with MACS restrictions, it is generally still possible to cut working test keys by using a steeper than usual angle and with cuts occupying slightly narrower than usual space on the key. Although insertion and removal of such keys is more difficult, they are sufficient for this limited (single-use) purpose. Alternatively, previously

Mango's Message

discovered master depths could be used in adjacent positions on subsequent test keys.

Also complicating our attack is the possibility that the master cuts lie somewhere between the "standard" depths ordinarily used by the lock manufacturer. This is more likely in older systems or those keyed by private locksmiths who may not follow manufacturer-standardized practices. When this is suspected to be the case, the attacker must probe the lock at more test cut depths, removing only a small amount of key material (.005 inches or so) from the position under test between probes. (This is similar to the procedure used when creating a key by the "impressing" technique and could be performed with a fine metal file.)

Some systems, especially in older installations, use master cuts that are consistently higher or lower than the change key cuts. This practice makes it especially easy to discover the master key with this attack.

Multi-level master systems may or may not present a special challenge. In standard TPP and RC systems, every pin stack has at most two cuts; "submasters" are implemented by using fixed change key biting on certain pins for locks within each submaster group. In such cases, the attack proceeds as described and yields the TMK. It is also possible, however, to implement hierarchical submastering by using more than two cuts on each pin stack. In such cases the TMK biting of a given pin may be ambiguous. An attacker can distinguish the true TMK cuts in such systems by conducting the attack on locks from different submaster groups. This may not always be necessary, however. It is common for such systems to

employ the convention that all of the TMK cuts are either above or below the submaster cuts.

Some larger installations put different groups of locks on distinct keyways, such that a change key for a lock in one group does not fit into the keyway of locks from others. The TMK is cut on a special "master" blank that fits all the keyways in the system. This practice, called *Sectional Mastering* or *Multiplex Mastering*, expands the number of effective differs in the system and reduces cross keying between different lock groups. Sectionally mastered systems are especially attractive targets for attack, since the TMK works for a very large number of locks across groups that would otherwise have to be keyed on different master systems. The attacker simply cuts the TMK biting (derived from a lock in any section) onto a blank milled for the master section.

It is worth noting that even "high security" pin tumbler lock designs, including those that use sidebar cuts and rotating pins, are usually in principle vulnerable to this attack; the only question is whether the attacker can obtain or fabricate the required blanks. Furthermore, our attack can be generalized to many other lock schemes, including, for example, certain high security lever lock and rotary tumbler designs (such as Abloy).

3.3. Experimental Results

It is easy to see that this attack is effective against the standard master keying schemes we described. It is natural to ask, then, whether master key systems deployed in practice follow these schemes and are therefore vulnerable. Unlike

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OID 11/02

computing systems that can be tested relatively easily and safely in isolated test bed environments running standard software, such a question can only be answered by attempting the attack against real installations. The reader is cautioned that reproduction of these experiments should be carried out only with the cooperation of the owner of the lock systems on which the attack is attempted.

We tested our attack against a variety of medium- and large-scale institutional master keyed installations, including both educational and commercial environments. Systems tested were both relatively new and relatively old, had been both factory-keyed as well as privately rekeyed, and included locks manufactured by Arrow (SFIC), Best (SFIC), Corbin Russwin, Schlage, and Yale. For the Best SFIC, Arrow SFIC and Schlage systems, we used portable key punches and a supply of blank keys brought to the facilities tested. For the Corbin Russwin and Yale systems, we pre-cut six test keys on a general purpose code machine (based on measurements previously taken from a change key) and used a metal file at the test site to progressively cut the test keys and finally to cut the full master biting onto a fresh blank key.

All required key blanks were procured from standard commercial sources (which can be found easily on the Internet with a search engine). Cost per blank ranged from US \$0.14 to US \$0.35 depending on the particular lock type, plus shipping. We used, for convenience in some of the attacks, key cutting machines, also available widely from commercial sources for a few hundred dollars. In other cases, we used a fine metal file and a dial caliper or micrometer to cut the keys to the correct biting depth. None of the equipment or supplies we used are restricted in any way. (Such restrictions, even if they existed, would not be especially effective at preventing potential attackers from obtaining blank keys, given the vast number of small businesses that have legitimate need for them (hardware stores, etc.).

In every case, the attack yielded the top master key biting, as expected. In general, it required only a few minutes to carry out, even when using a file to cut the keys.

All six Arrow SFIC and Best SFIC systems we tested had all (six or seven) pin stacks mastered with a TPP format. The two Corbin Russwin (system 70) systems each had three pin stacks (out of six) mastered, again with a TPP format. The Schlage system used an RC-based scheme, with every pin mastered and two master cuts used on each change key. The Yale system was also RC-based, with one master cut used on each change key. Several of the systems had multi-level mastering hierarchies; the attack yielded the TMK in all cases.

Notably, although some of the complications discussed in the previous section (such as more than one master cut per pin stack, selective keying, or non-standard master depths) are possible in principle, we did not encounter them. Every system we tested was keyed according to standard (TPP or RC) industry practice, had at most one master cut per pin and employed standard depths, making the attacker's job especially straightforward. Although our experiments hardly constitute an exhaustive survey, they were conducted across a wide variety of facilities that seem reasonably representative of a large segment of US institutional lock installations. A check of several other lock vendors' standard master keying practices further supports this conclusion.

4. Countermeasures

Our adaptive oracle attack is only effective against locks that have a single shear line used by both master and change keys. Although this is the case with the majority of mastered locks, there are commercially available designs that do not have this property. Locks with a separate master ring, for example, require that all pin stacks be aligned to the same one of two distinct master or change shear lines, and therefore do not provide feedback about the master biting of a pin given the change bittings of the other pins.

A master ring lock has two concentric plugs, with the keyway cut into the inner plug. Two distinct shear lines are formed. The pin stacks are correspondingly taller, with one cut on each stack designed to be able to reach one shear line and another cut designed to reach the other. A few master ring locks are still commercially manufactured, but the design has largely fallen out of favor for most applications. (Master ring locks, however, are actually *more* vulnerable to reverse engineering from lock disassembly by an attacker without access to the change key.) Similarly, positional lock schemes, in which each lock uses a unique subset of a large number of possible pin positions, cannot be decoded in this manner (but, again, are still vulnerable to other attacks).

This attack assumes that the attacker has access to a modest supply of blank keys for the system. Whether this is a practical assumption depends on the particular system, of course, and some "restricted keyway" lock products may make it more difficult for the attacker to obtain blanks from commercial sources. However, blanks for many so-called restricted systems may in fact be available from aftermarket vendors. Even when an exact blank is not commercially available, often a different key can be milled down to fit. Unusual or patent-protected key designs, such as those employing a sidebar cut, may be more difficult to procure directly or modify from commercial sources, but blanks can still often be fabricated in small quantities relatively easily by casting (especially since the attacker already possesses a working change key cut on the correct blank).

Casting or milling does significantly increase the skill and effort required, of course. Many lock manufacturers and locksmiths believe that patented key designs for which there are no legally available blanks deter the majority of casual attackers. Evaluating the practical effectiveness of patent-based key control must take into account factors beyond the lock designs themselves, including future industry behavior and the likelihood of the continued validity and enforcement of the patents.

In smaller master systems, it may be possible to limit the information contained in any given lock, at the expense of increased vulnerability to cross keying, key interchange, and picking. In standard (RC and TPP) master schemes, each pin stack is cut only at the master and change depths. The attacker exploits the fact that any working depths not corresponding to the change key must be on the master. A natural way to frustrate the attack, therefore, is to add "false" cuts to some pin stacks that do not correspond to the master and that do not appear in the majority of other locks in the system. If one "extra" cut is added to each pin stack, the attacker will learn " 2^P " different possible master keys from one lock, only one of which will correspond to the "true" TMK biting. These extra cuts must be selected very carefully, however, since each such cut reduces the number of unique differs available in the system. Effectively, the extra

cuts create new subclasses of sub-master keys among locks that share the same false cuts, which the attacker must eliminate before learning the true high-level master key. In practice, this may not be a useful or safe countermeasure on conventional locks with a small number of pins, which may not be able to tolerate the effective reduction in key space that this approach entails.

5. Conclusions and Lessons Learned

In this paper, we have shown a very simple rights amplification attack that is effective against virtually all conventional master-keyed pin tumbler locks, including many so-called "high-security" products. This attack is an especially serious threat to the security of such systems because it is easy to carry out, leaves essentially no forensic evidence, requires no special skills and uses only very limited resources (a few blank keys and a file, in the case of the most frugal attacker). Compounding the threat are the facts that the attacker need engage only in apparently ordinary behavior \propto operating the lock to which he or she already has legitimate access \propto and that the attack can be carried out over a period of time in several (interrupted) sessions.

Any successful compromise of a master keyed installation can be very difficult and costly to remedy (assuming it is even discovered). Every mastered lock must be rekeyed and, depending how the keying is done, new keys distributed to the key holders. Not only is this very expensive, but system-wide re-keying can also require a considerable period of time to complete, during which all the old locks remain exposed. In light of the inherent security vulnerabilities introduced by master keying, owners of lock systems should consider carefully whether the security risks of mastering outweigh its convenience benefits. (Unfortunately, the computing world is not alone in often putting a premium on convenience over security.)

If master keying must be used, simple countermeasures, especially the use of false cuts in mastered pin stacks, can frustrate the adaptive oracle attack and may be appropriate in limited applications. A more effective approach entails the use of lock designs, such as master rings, bicentric cylinders, and positional dimple key systems, that resist such attacks intrinsically.

It is worth noting that these attacks become rather obvious when the basic analysis techniques of cryptology and computer security are employed. (In fact, as noted previously, these attacks appear to have been discovered and rediscovered independently several times, occasionally passed on as underground engineering and locksmithing folklore but never documented in the literature). One of the first questions asked about any proposed cryptosystem, for example, is whether it is possible to test the value of one key bit independently from the others. If it is, the system would be considered hopelessly insecure, since an attack would take time only linear in the number of key bits, instead of exponential. The same question readily translates into the mechanical lock domain by substituting "pin stack" for "key bit." (In fact, our master key discovery scheme bears a striking resemblance to a famous character-by-character attack against the Tenex password mechanism.) Similarly, the notion of an online service as an authentication oracle is familiar in the analysis of cryptographic systems. Mechanical locks can likewise be modeled as online oracles that accept or reject keys, and security analysis conducted accordingly.

Finally, the attack against TPP systems that compares many different change keys is reminiscent of "related key" attacks against cryptosystems, with a threat model much like "traitor tracing" in broadcast encryption. Perhaps other aspects of the analysis of mechanical and physical security would benefit from similar analogies to computing systems and cryptology.

On the other side of the coin, the vulnerability to rights amplification in master keying of mechanical locks recalls similar weaknesses in cryptographic systems that attempt analogous capabilities. Consider, for example, the vulnerabilities inherent in "key escrow" systems that attempt to facilitate emergency decryption by a central third party of data encrypted with many different users' keys. Even more direct analogies can be found in digital rights management schemes and smartcard-based digital cash systems that contain but aim to hide, as master keyed locks do, global secrets from their users.

6. Acknowledgments

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About Matt Blaze...

Mr. Blaze is a research scientist at AT&T Labs - Research, where he studies security and cryptology. He's especially interested in trust management, smart cards, cryptographic protocols, large-scale systems, physical security, and cryptography policy.

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- University of Pennsylvania, Philadelphia, PA. Adjunct Associate Professor of Computer and Information Science.

Next month you will learn Mr. Blaze's position on the public dissemination of information, and whether this type of information should remain secret.

Letters

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Thank you Marc Goldberg.

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Thanks so much for the A1 cylinder puller prize I won for a Technitip submitted. It works great. I was all ready to purchase one and

then I won it. It will be very useful.

Thanks again.

Gary Siebring
Iowa

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Rod
Texas

Credit Card Headaches

Even though I accept Visa, MasterCard, Discover, and AMEX along with Check Cards when the customer decides to use them, which at this point is very rare, I'd like to distinguish Debit Cards from ATM cards. A Debt Card is better than a check for three reasons:

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3. There is no addition charge for using most bank debit cards like Visa for example.

While ATM cards can be used the same way, the charges can vary from a dollar per transaction up, depending on whether the banking consumer uses their bank, or another ATM.

Finally I'd like to educate my constituents regarding check policy refusal. I realized from getting bad checks in the past that this is both anxiety causing, and bad for economics. To refuse, however, is against commerce law. However, when a collection agency can't collect these checks lawfully,



there's a legal recourse called "Warrant In Debt." Through this process each merchant has paper evidence where a judge can issue a judgment. Once the judgment is legally obtained, the defendant has two choices, either make good on the debt or serve it out in jail, where they work out the monies owed which is sent to the creditor. Just make sure the defendant is made responsible for all court costs also. This way the loss is recovered.

Willie Bowen
E-mail

Accepting Credit Cards

I want to join the N.S.O. again, but my money is a little short right now. I'm working on buying a van to work out of. The only reason I'm writing this letter is so that when I do get my van, I'd like to find out about accepting credit cards. I've talked to my bank about this, but they said I have to have a landmark business to operate one. Do you have any suggestions? Thank you for the time and support.

I can be reached at: 236 Kellogg Fork Rd., Sunbury, N.C., 27979. Phone: (252) 465-8482 or (252) 465-8516.

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LOCKSMITH

The right tool for the job makes all the difference in the world. It's an old saying, but it couldn't be truer. Besides knowledge, the most important weapon in any locksmith's arsenal is tools. You can never have enough, let alone too many.

It doesn't matter what you do, if you're doing it with the wrong tool, you're making life much more difficult than it needs to be. Tools are designed to not only make life and the job you are doing easier, but safer and faster as well. Don't short-change yourself. Get the tools you need and live happily ever after. You will never regret it.

TOOLS

A1 Bullseye Jigs

A1 Security Manufacturing has made a slight modification to its NEW Bullseye Cabinet Lock Installation Jig (#BUL-1). This tool is designed to provide quick and easy installation using interchangeable bushings for 3/4" cam locks and 1-1/4" I/core locks. The self-centering jig features markings in 1/8" graduations, a built-in level, and steel bushings. This jig makes it easy for locksmiths to recommend and install cabinet lock upgrades to I/core locks.



**A1 Bulls Eye Installation Tool
for Cylindrical Locksets
Made in U.S.A.**



**Bulls Eye Cabinet Lock
Installation Jig #BUL-2
Made in U.S.A.**



A new modification eliminates the oversized 7/8 bushing and replaces it with the 3/4" bushing. Owners who prefer the oversized bushing may order them (pairs) as an accessory (#CJ-037).

The company recently introduced a second Bullseye Jig. This economical installation jig is designed for standard 1-1/2" and 2-1/8" crossbores. Unlike other jigs, the #BUL-2 is conveniently designed to work with conventional hole saws. The jig is self-centering, accommodates 1-1/2" and 2-1/8" crossbores, and boasts a handy toggle that allows for instant backset adjustment. The tool also features a guide for drilling the 1" latch hole. Optional straps (#BUL-SS2) are also available for interconnecting two units. This comes in handy for interconnecting locksets/dual bores.

AABLE's Patented U1 Ford Ignition Removal Kit

You asked for a tool to do those pesky Ford Focus locks and Frank Markisello from AABLE Locksmiths has come through. He has designed a complete kit, and not only for the old type Focus. This kit will do the new style



with no sidebar #707592. Also some of the following; the new #703596 with sidebar has a larger face including Escape, Contour, Mystique, Mazda, Tribute, Mountaineer, Continental, Mark VIII, Explorer, T-Bird, Lincoln LS, all Focus and more. No Other Tool Kit Is Needed.

This kit includes 1 force tool, 3 drill guides, 3 numbered drill and arbors, 1 turn wrench, 1 sidebar pressure tool, 1 wafer holding tool, 3 sets of easy step by step photo instructions showing all the different types locks and how to get them out in less than 5 minutes.

ASP's Transponder Programmer



T-code has been used in England and Europe for the last year and is now making its North American introduction by teaming up with ASP. ASP, Inc. introduces T-Code transponder key programming machine for Audi, Volkswagen, Cadillac Catera, Ford USA, Mitsubishi, Nissan, and Infiniti.

T-Code has full key programming function for all FORD USA PATS systems. T-Code includes complete instruction manual and telephone technical support. Future sales of updates are to include

Chrysler/Jeep and Honda.

For more information visit www.tcodeusa.com or contact your favorite ASP distributor.



foam pad and a mini locksmith vice mounted to the base make for a solid working surface. The unit can be used in the shop or on the road.

Framon's Impressioning Tool

Framon's Impressioning Tool (IMMS001) has been a locksmith favorite for over ten years. The tool takes place of locking pliers and keeps the turning pressure along the centerline of the key blank, resulting in less key breakage. Unlike others on the market, the tool does not require an external wrench to tighten the key; the screws are preset at the factory and will last for years under normal use. If the screws do need replacement, they can be changed out in seconds.

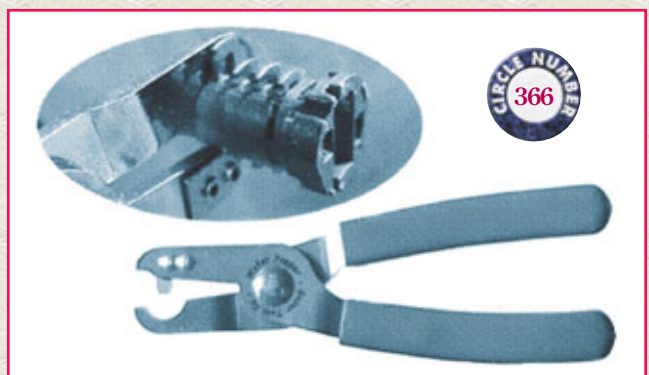


The base of the impressioning tool is turned to lock keys in place. The firm grip prevents keys from moving once locked in, and gives the user complete control when fitting keys.

Gator Tool "Wafer Popper"

If it's not in your toolbox you're damaging locks. The Wafer Popper was developed to help in the wafer removal process. Many times in locksmithing, removal of stuck or peened wafers can be a circus act, trying to juggle the lock, screwdriver and hammer all with just two hands. Have you ever lost a wafer, broke a lock or got your screwdriver stuck in the core? Not anymore...one hand holds and squeezes the tool; the other hand catches or rotates the lock.

This tool works so well to we fit a slogan to match the speed, "Click...Click...Click... It's just that quick". The



Security Cart

Locksmiths and security installers can save time and money with a handy new rolling tool cart from Masters Electronic Supply. It holds all tools and hardware necessary for efficient installations. The cart contains all hand held tools, connectors, fasteners and



mounting hardware for installing access control, alarm and CCTV systems.

The complete Security Cart contains a Tool Kit, CCTV Kit, Mounting Hardware Kit, Machine Screw Kit and Fuse and Wire Termination Kit. The cart is made of polyethylene, is compartmentalized and is lockable.

You can even leave it on the job site with your tools and equipment secured, and organized, ready for the next day's work.

ESP Mobile Pinning Station

The Mobile Pinning Station from ESP includes a durable Corian base with 11 pockets for holding pins. A

tool can do the standard locks or the offset wafer equally as well. The handles are cushioned for comfort, torsion spring for one hand use and nickel-plated for weather and durability.

Gil-Ray Tools Sharpens Dull Cutter Wheels

Gil-Ray Tools has 57 years experience in manufacturing and sharpening key machine cutter wheels. Over the years they have manufactured thousands of new cutters under contract with the most popular key machine companies. These cutters were made by Gil-Ray and had the key machine companies' name stamped on the side of the cutters.



Gil-Ray Tools offers a convenient mail in sharpening service. Key cutters sharpened by Gil-Ray are precision ground to original manufacturers blueprint specifications. This is the same way that cutters are brought into specs during manufacturing. Gil-Ray does not use any Acid or Vapor Blasting processes which can damage the precision cutting edges.

All styles, types and brands of cutters can be sharpened like new, and many can be sharpened 5 or 6 times before replacement is needed. All Code Cutters, Duplicating Cutters, Flat Slotters, and End Mills can be sharpened. Sets of Code Cutters can be sharpened with matched diameters so that they can be interchanged like new wheels are on Code machines. An investment in sharpening is a good value considering the much higher cost of replacement cutters. Wheels sharpened by Gil-Ray will cut smoother and more accurately than before.

GKL Hinge Doctor

Did you ever have to file a door strike because the latch is suddenly below the strike hole? Or the top of the door is hitting the doorframe? Well put away that file and you won't need to remove the hinge to bend it back in your vise either. Just use the new "Hinge Doctor" tool. It will fix that sagging door in a minute in just two easy steps.

Slide the tool over the hinge while the door is closed, hold it there with



one hand while you open the door with your other hand. The door will start to bind and will feel springy. Continue pulling the door open another few inches or so. At this point, if it's a hollow metal door, you're realigning the hinge mounting plate, or if it's a wood door, the hinge will start bending back to its original shape.

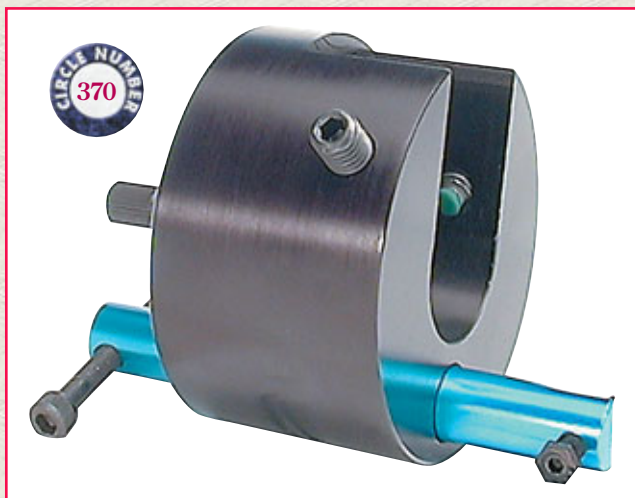
High Tech Tools Opening System

The new High Tech Tools Locksmith Master Super Set is a truly complete car opening system incorporating 1,200 pages of car opening photos and diagrams, information manual, air bag manual, 45 tools, air jack, air wedge, Ultra Jack tool, one-piece long reach tool, a High Tech Wedge, training video and more.



HPC's Lever Lock Handle Remover

With the advent of the Americans with Disabilities Act (ADA), lever lock handles have become common in schools, businesses, and government offices. Servicing a locked lever handle used to require either picking the lock or destroying it.



Continued on page 26



What's Your Time Worth?



Time is money and saving a few seconds on every key you cut can really add up.

Cash in by cutting more keys in less time.

Ask for the HPC Trace-A-Key® 3344HQT Semi-Automatic duplicator.

It's durable, accurate, and FAST!



The Automate™ allows you to do other work while duplicating keys.

Just load the keys and it will do the rest.

Ask for the HPC Automate™ 6666HQT, the fully automated key duplicator.

It's sturdy, precise, and AUTOMATIC!



HPC, Inc.
3999 N. 25th Ave.
Schiller Park, IL 60176 USA
tel: 847.671.6280
fax: 847.671.6343
www.hpcworld.com

HPC's new Lever Lock Handle Remover (No. LHR-100) eliminates the need to destroy the lock when picking is not an option. The tool is affixed to the lever handle with non-marring set screws, the pin depressor is used to engage the release mechanism on the handle, then a few turns of the compression bolt removes the handle, without damaging the lock or handle.

The setscrews and pin depressors are fully adjustable allowing this tool to be used on most lever handles on the market. Its compact size makes it easy to carry in your toolbox. HPC's Lever Lock Handle Remover is simple to use with amazing results!

Kaba Ilco Plug Holders

As every locksmith knows, once the pins are spilled from a plug they fall to the floor and instantly turn invisible. Kaba Ilco Corp. has a cure for this problem with two new Ilco Plug Holders with expanded capabilities.

The convenient size and solid aluminum design allow the fixtures to be used three ways: carried and placed on any work surface, held in vise jaws or permanently mounted to a workbench.

The Ilco 785-00-8X accepts one each of the four most common plug diameters plus it has positions to hold mortise/rim, key-in-knob and ICC cylinder bodies. Both the plug and the cylinder body are held in a convenient position for quick re-assembly, saving time and frustration while improving efficiency. A newly pinned cylinder can even be tested prior to mounting it back in the lock.



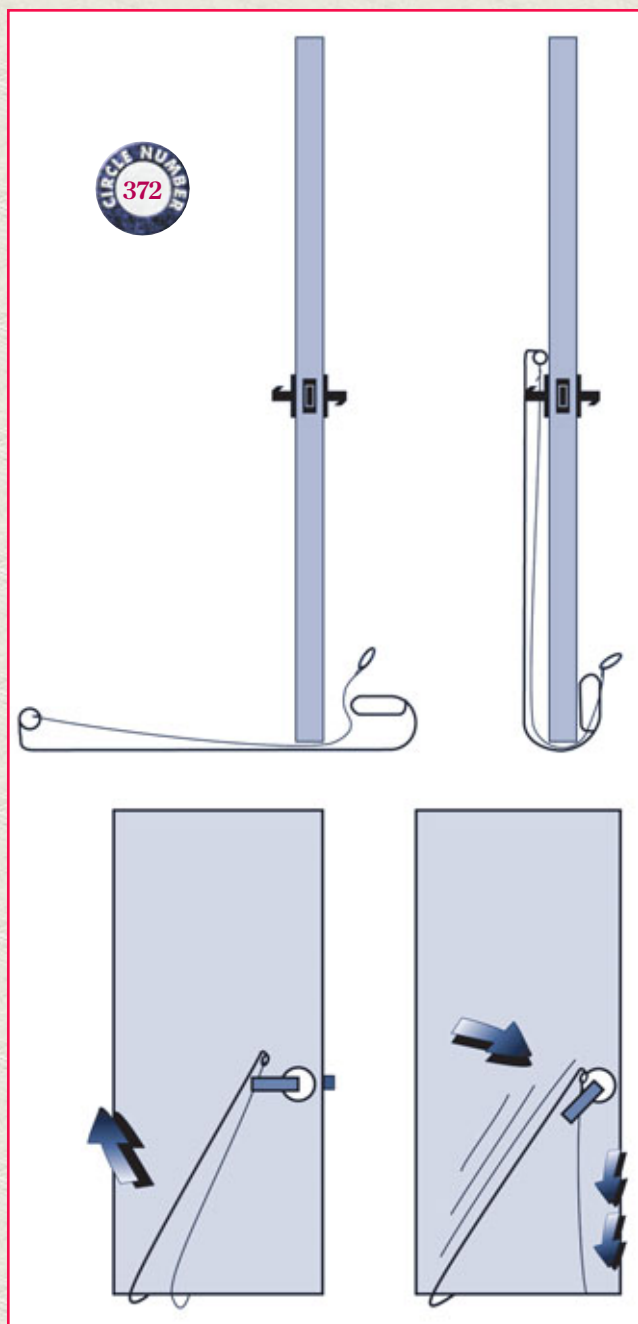
The Ilco 786-00-8X holds the most common size plug in production today and will accept Arrow, Kwikset, Schlage and many other popular brands. The eight plug holding positions are especially useful when master pinning many plugs.

Ilco Cylinder Pinning Fixtures are available from the distributor who provides you with your other high quality Ilco products.

Keedex K-22 Lever Opening Tool

If you can slide this tool under the door, you will open it! The K-22 Lever Opening Tool is invaluable for lockouts involving lever locks. Especially important for situations involving locks that have malfunctioned or that are pick resistant. This tool can save precious time and valuable hardware.

This was dramatically illustrated shortly after the prototype for this tool was developed. Keedex received a call from a manufacturer's representative, who was pleading to borrow the K-22. You see; he had sold an electronic locking system to a new hotel. Several locks malfunctioned, blocking access to the rooms, and the hotel was to have their "sold out" grand opening in just two days. The bypass keys were ineffective. With the K-22 in hand, they were able to gain access to the rooms, and service the locks before the hotel was opened.



While the K-22 is designed to be used with lever locks, we have heard of locksmiths using it for other applications. Some locksmiths have found it useful for unlocking cars equipped with electric locks. We have heard of locksmiths modifying the K-22 and using it on knobs as well.

LAB Annex I/C Tool

The stainless steel LAB Interchangeable Core Annex(r) offers the simplest method for the loading and unloading of interchangeable core pins, springs and caps, using only one instrument for both functions.

A second time saving feature is a slide out codebook below the area where the core is slid in place. This allows the user to unload the core pins, springs, and caps into a confined area without spilling the parts in or around the work area.

The slide out codebook is also used to decode the core



to determine the biting of the control key when it is not available and also determine the top master key biting.

Lockmasters Keyless Remote Check & Safe Opening Kit

With keyless remote technology quickly becoming the standard for today's automobiles, the consumer is often caught off guard when they realize fobs require batteries.

Provide your customers with a little extra when you check their keyless remote and start moving high-margin batteries in no time. Lockmasters' Keyless Remote Check allows you to check the status of customers' Keyless Remotes in seconds. This portable, hand-held unit allows the battery to be checked without disassembly of the

Continued on page 30



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Max**



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Flat Max Tool Item # FM \$29.95 Reg \$34.95

One Hand Jack Tools and Sets

Standard One Hand Jack Tool

#OHJ \$24.95

Super One Hand Jack Tool

#SOHJ \$29.95



One Hand Jack Set Includes: Standard One Hand Jack Tool, Super Max Long Reach Tool, Air Wedge.

Item #OHJS2 \$59.95 Reg \$69.95

Super One Hand Jack Set Includes: Super One Hand Jack Tool, Super Max Long Reach Tool, Super Air Wedge.

#SOHJS2 \$69.95 Reg \$79.95

Super Mega Jack Set Includes: Super size One Hand Jack Tool, Standard Size One Hand Jack Tool, Super Max Long Reach Tool, Super Air Wedge, Wonder Shield, Carrying Case.

Item #SMJS2 \$99.95 Reg \$129.95



Grip Max™

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Adjustable Handle

Stainless Long Reach Now you can have maximum control over your long reach tool with our unique adjustable Handle. Lock the Stainless Steel rod at any position from 1' to 4' giving you any length tool you need! Now reach any lock button close or far!

Grip Max tool # HM \$29.95 Reg \$34.95



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All New!

One Hand Jack Tool

The One Hand Jack Tool is available in two sizes, and is designed to work with the Air Jack and our Long Reach Tools. Just insert the tool between the door and the Frame to create space to insert the Air Jack



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The Quick Info Manual



The Quick Info Manual has all the information you need to cut a key, code series, space and depth, Keying kits, vats, pats, Keyway designation, Code machine settings, and much more. Included with all complete sets.

Saturn	2003-2004		Codes:	H0001-3988			SN04	
Depth & Space/ Framon	Mfg. - Key #		Keying Kits	1200CM	CF215	Cutr	CW-1011	
315 1	1.033	.308	ILCO P1110	ignition	Framon	.092	Blk 3 Incr .025	
290 2	.942	.400	EZ B91, B96	A-49-101, SK6409	ITL	#519 -fit3 -ins1		
265 3	.850	.492	Tayl	door-trunk	Guide Keys	AGK621		
239 4	.757	.584	Strat	A-49-101, SK6409	Curtis	GM-6	GM-6A 15W-45	
5	6.65	6.76	Bör		KWY			
6	5.73	.768	Curt	B-96				
7	4.81	.860	Sil					
8	3.89	.952	Jet	B96-NP		Gaug	tip	
9	2.95	1.044	Flat	9wafer SB		domestic		
0								
1								



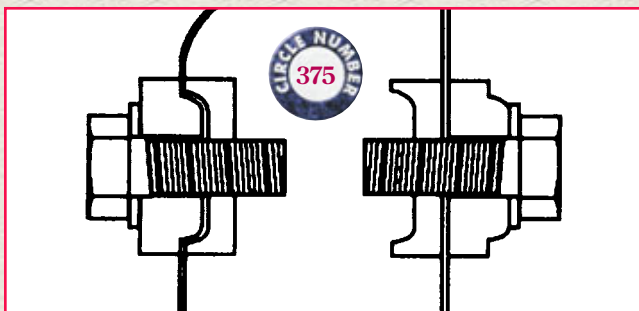
remote. Simply place the fob against the specified test area on the front of the unit and in seconds you'll know the battery status.

Lockmasters' also has a new Complete Safe Opening Kit, and its name says it all. The kit provides virtually all the specialized tools you need to complete most of the basic safe opening jobs you're likely to encounter.

Included in the kit are Lockmasters' Magnum Bullet Drill Rig, Lock Amplifier, Dial Puller, Emergency Dial, Straight Lit, Six-Piece Punch Set, a 17" Hawkeye Limited Edition borescope, and 5 Mr. Twister Drill bits.

Lock Technology Lock Reforming Tool

The Model 700 Lock Reforming Tool from Lock Technology Inc. fits GM, Ford Chrysler and most import cars. The tool instantly reforms damaged lock openings to the original contour of the auto.



LockTools.com TimeSaver Installation Jig

The new TimeSaver 1 installation jig from LockTools.com is a tool for all Schlage lever installations,



including the new Cobra by Schlage unit. The tool replaces an earlier version of the TimeSaver 1, which applied to only a limited number of Schlage units. Also available from LockTools.com is the TimeSaver 15, an installation jig for the Kaba Ilco 5000.

Major Manufacturing Door Totes

You've asked for help, and Major Manufacturing has answered the call, with the announcement of their two new Door Totes.

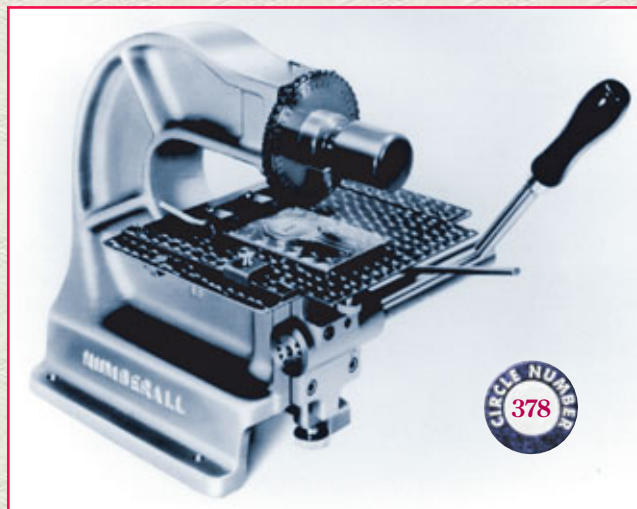
The Door Tote is the perfect partner for any solo door operation. It's easy to use, and it provides a valuable measure of safety on the job. Say goodbye to the old days of throwing your back out in a futile attempt at moving a door on your own, or damaging your customer's expensive property by trying to "walk" a door out of the way. The DT-100 Door Tote disassembles into three smaller components for convenient storage in your service vehicle.



Assembly of the unit takes seconds, and you're ready to mobilize any door up to 1-3/4" thick. Their compact model, the DT-200, comes in a single piece and provides horizontal movement of the door unit. Both Door Totes models are lined to avoid scarring of the door surface and come equipped with pneumatic tires for those occasions when the job is littered with debris.

Numberall Simplified Key Marking

Numberall Stamp & Tool Co., Inc is featuring a line of specialized key marking equipment. This equipment is ideal for hotel and motel industries, universities, school



districts and housing authorities as well as locksmiths. It is useful when a large number of keys must be stamped with identifying numbers and letters.

The equipment ranges from the economical Model 23 Type holder to the Model 137 motorized benchmark press. Included is the Model 40B (shown) which features a large easy to read dial and a carriage table, which automatically advances after each impression.

Custom made key nests which fit into the presses simplifies the marking operation even more. Simply drop the key into the nest and make the impression. Every key is marked in exactly the same place!

PRO-LOK Key King 7

A Great Gift or retail counter item: This tool is a Key Ring containing 7 Multi Purpose Tools: Large gripping Pliers, Fine gripping Pliers/Tweezers, Wire Strippers, Wire Cutters (can easily cut 12-gauge electrical wire), Large Phillips Screwdriver, Small Phillips Screwdriver, Large Standard Screwdriver and an Interlocking Key Ring Holder.


These tools come boxed in a countertop display which contains 6 individually clamshell packaged tools. The packaging is full color for retail display to increase impulse sales.

These tools are lightweight - only 1.4 ounces! It will not weigh down your key ring. Incredibly strong and solidly constructed of hardened stainless steel for durability. This tool can withstand 90 lbs. of down force on the handles. Rivets will shear before the handles or the jaw will break. Comes with a protective pouch and an interlocking key ring holder to attach easily to your key ring. Lifetime warranty.



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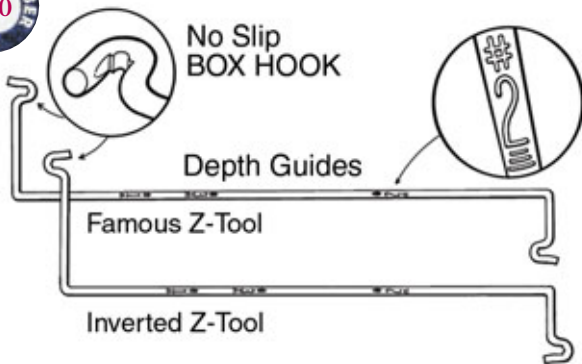
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OID 03/04

Slide Lock Tool Co. Z-Tools

The Z-Tool and Inverted Z-Tool from Slide Lock Tool Co. team up for a whopping 70% of all openings as

CIRCLE NUMBER
380



Z-Tool



Inverted Z-Tool

assigned by the 144 page, 15th Edition Z-Tool System Manual. No spring steel here. These are made from a custom ordered, very hard, very thin stainless steel rod that will not go soft after years of use.

Both tools have milled out Box Hooks, which, dig into the lock linkages for no slip openings. Both also have depth guides to zero in on the smaller targets of modern lock systems.

Tri-City Lock Saw Guides

The Hole Saw Alignment Guides from Tri-City Lock Company allow an installer to over bore existing wood or metal hole diameters of 5/8", 3/4" and 1-1/2" without plywood, jigs or clamps.



TNL

THE NATIONAL LOCKSMITH Cards & Keys

W.H. Software



Key blank cross reference & Code card production

The first section of the program features a highly comprehensive database of key-blank reference numbers from 34 different manufacturers, 70,000 keys all cross indexed. This section of the program allows you to enter a key-blank reference number from a particular manufacturer and have this instantly converted to be the reference number of the brand of key-blank you use.

Print your own Code Cards with:

- Card Number • Space and Depth measurements in Metric or Imperial • Code series information (where applicable) • Cutter number • Key-blank number • Graphical representation of the key position in the jaw (allows easy positioning, and prevents mistakes) • Space & depth reference marks for needles.

The program comes pre-loaded with well over 700 cards, and also includes the ability to make your own cards should you require. Creates Punch Machine cards too!

Cards & Keys software includes BOTH card making ability and Key Companion software.

If you own InstaCode this module is already included.

SYSTEM REQUIREMENTS: The minimum computer hardware requirements are a Pentium CPU, 32MB of RAM and 50MB of available hard drive space, mouse or other pointing device and Windows 95, 98, ME, NT, XP or 2000. A Windows supported printer is optional.



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QUICK ENTRY UPDATE



by
Steve Young

TECH TRAIN
PRODUCTIONS

2003 Saturn Ion Sedan

The Saturn Ion Sedan was introduced early in 2003. (See *photograph 1.*) A second model, the Saturn Ion Quad Coupe will be introduced later in the year. (See *photograph 2.*) The Ion Sedan comes in three different models, known as the Ion One Sedan, Ion Two Sedan, and Ion Three Sedan. The differences between the three different models are primarily differences in engines, drive trains and option packages. The Ion One Sedan is the low-end model and the Ion Three Sedan is the high-end model. The differences in the three models do not affect the doors or the procedure that is used to unlock the car.

All of the Ion Sedans are true sedans and have four traditional doors. The Ion Quad Coupe, as the name implies, has two traditional doors, but it also has two smaller doors that are hinged at the rear. The rear doors can only be opened after the front door is already open. The opening procedure for the Quad Coupe will be covered in a future article.

To unlock any of the Saturn Ion Sedans, begin by wedging open a gap between the weather-stripping and the window glass near the rear of the main window on the rear door. (See *photograph 3.*) An inspection light can be used to help you locate the linkage rods inside the door, but the linkage can also be located by feel.



1. Saturn Ion Sedan.



2. Saturn Ion
Quad Coupe.



3. The TT-1001
tool
is inserted in
the rear door.

Continued on page 36

THE HINGE DOCTOR

by GKL Products

www.hingedoctor.com

The Hinge Doctor



HA3
for ball-
bearing &
large hinges

The Hinge Doctor set of tools is a great way to repair those sagging metal doors! All you do to fix it is to slip the tool over the door hinge and open the door. This action causes the door hinge to bind while the tool is in place. Open the door only an inch or two past the point of where it binds against the tool, then remove the tool from the hinge and check the door. That's usually all it takes!

"I used mine twice in the last week. It really impressed my customers that a "little girl" like myself could repair a big ol' steel door by myself! I never let them see my secret weapon, I let them assume that I had to take the door down and do all sorts of work to it!" -- Melanie Long, Lock Stock & Barrel



HA1
for
4.5" x 4.5"
hinges

Guaranteed for Life!



"The Hinge Doctor is a great way to repair those sagging metal doors. Slip the tool over the hinge and open the door an inch or two past the point where the tool binds against the hinge, remove the tool and check the door, which should now be working properly," Joe Maruscak - Spring City, PA - USA

If you're a locksmith these tools will turn a profit the 1st time you use them!

Uses - schools, hospitals, commercial buildings, storefronts with butt hinges, office doors, new construction, door alignment, sagging doors, jail cells, anywhere there are commercial grade hinges.

HA1 For
Standard
Commercial
4-1/2" x 4-1/2"
Butt Hinges

HA3
For Ball-
Bearing &
Larger
Commercial Hinges

HA4
For Prison
& Institutional
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Once the gap has been established, the Tech-Train 1001 tool is inserted into the door with the hook facing toward the rear of the vehicle. The hooked end of the tool is used to grip the upper of the two horizontal linkage rods inside the door and move it to the rear to unlock the door. (See photograph 4.)

As with all Saturn vehicles, access to the components inside the door is gained by removing the outer skin of the door rather than the inner door panel. The job is essentially the same for all Saturn vehicles. The outer skin is secured to the frame of the door with a number of Torx® screws. Before the door skin can be removed, the weather-stripping at the base of the window and the outside door handle must be removed. If you are working on the front door, the rear-view mirror assembly will also have to be removed as well. The job may sound difficult, but in reality it's easier than most traditional types of doors.

Quick Reference Guide

Vehicle: 2003 Saturn Ion Sedan	Code Series: G0001-G3631
Direction of Turn: Counter-Clockwise (passenger's side)	Key Blank: Strattec: 599487; Jet: B106NP; ILCO EZ/Curtis: B106
Lock System: GM 10-Cut	
Lock Manufacturer: Strattec	

Photograph 5, shows the rear door of the Saturn Ion Sedan with the outer skin removed. The TT-1001 is in position to unlock the door by moving the upper linkage rod to the rear. This vehicle, like the Saturn VUE and Hummer H2, uses the new GM "Corporate" door latch. This latch will be used on most of the new vehicles that GM will be introducing in the next few years. From the locksmith's point of view, the most important difference between this latch and the older latch is that the lock control linkage rod is now the upper of the two linkage rods, and it moves to the rear rather than forward to unlock the door.

Photograph 6, shows a closer view of how the tool is used inside the door. Because the linkage rod is almost directly below the insertion point of the tool, the TT-1001 tool is a better choice for unlocking the Ion Sedan than the TT-1003 or TT-1008, which are designed to reach rods that are offset from the insertion point of the tool. Once the end of the TT-1001 tool is hooked around the linkage rod, the handle of the tool is twisted to bind the linkage rod. Levering the linkage rod to the rear will then unlock the door.

The door trim around the windows on the Saturn Ion sedan is made of a thin sheet metal. For that reason, I do not recommend using the Jiffy-Jak Vehicle Entry System on this vehicle. Applying too much pressure to the doorframe could easily bend or dent the trim. **TNL**



4. Lever the linkage rod to the rear to unlock the door.



5. The outer skin of the door removed showing components inside.



6. The hooked end of the tool grips the upper linkage rod.



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TRIBUTE
DX



Last month we covered the ignition lock and door lock. This month we conclude with the hatch lock, glove box lock and programming procedures.

HATCH LOCK



1. The rear hatch lock cylinder is mounted in the rear hatch and can be removed from the inside hatch cavity.



2. The rear hatch panel must be removed to service the hatch lock cylinder.



3. On the bottom edge of the panel are four panel screws that must be removed.



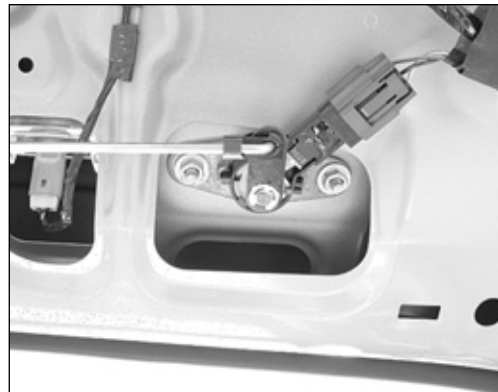
4. Once those panel screws are removed you can gently pull the panel away from the body of the hatch. They use the standard push-in style panel clips.



5. You cannot get the panel off until you open the hatch glass.



6. The glass release and hatch release levers are located in the middle of the hatch under the chrome trim with the Mazda logo on it.



7. The hatch lock cylinder is held in with two 10mm nuts. You must also disconnect the electrical switch.

2001 Tribute

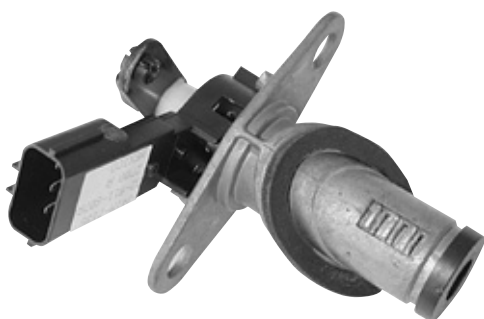
2001
Tribute
Part 2



by
Michael
Hyde



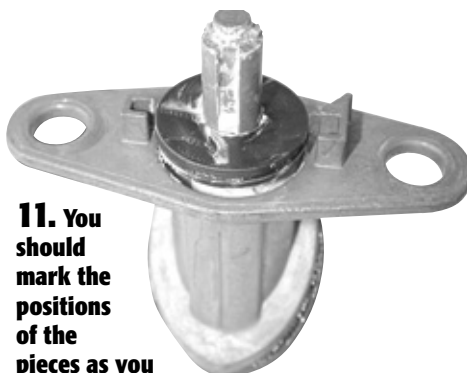
8. The hatch cylinder slides right out.



9. There is a large drain hole opening just like the door lock cylinder.



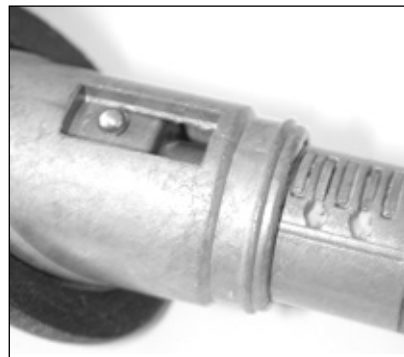
10. Carefully remove the tailpiece and the electrical switch from the lock cylinder.



11. You should mark the positions of the pieces as you remove them.



12. Unsnap the plastic trim on the front of the lock cylinder.



13. The lock cylinder is warded and you will need to pick the lock or use a key to remove the cylinder plug. There is also a ball bearing detent that you need to watch out for when disassembling.



■ ML9000 Series

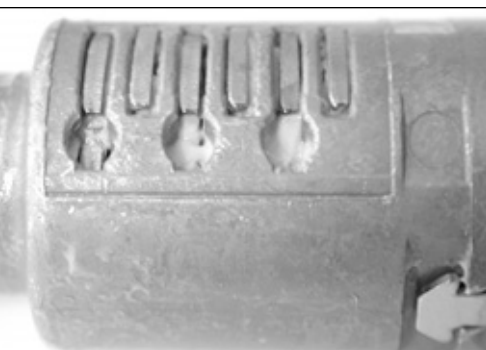
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14. The hatch lock cylinder plug has 6 tumblers in it. They are positions 1 through 6.

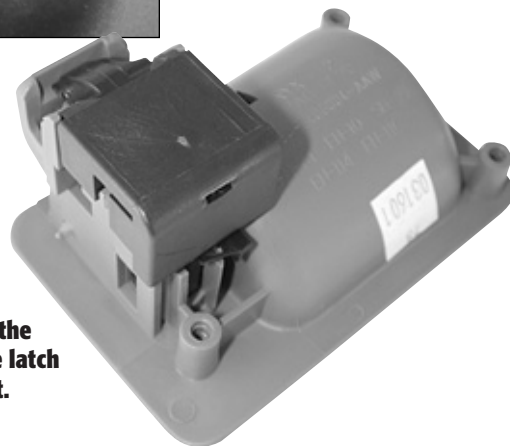
GLOVE BOX LOCK



15. This model has locking glove box.



16. The glove box lock cylinder is part of the handle and latch assembly. The assembly is held to the door with 3 screws.



17. Remove the black plastic cover on the rear of the assembly. Watch out for the latch spring as you disassemble it.

Continued on page 42

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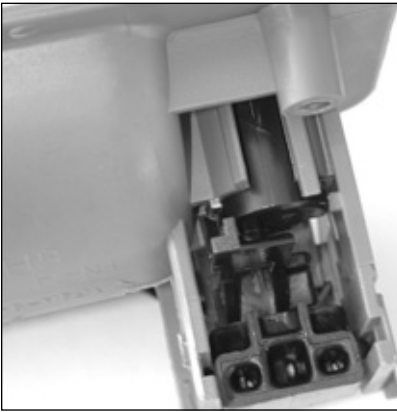
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18. There is retainer wafer on the rear of the cylinder plug.



20. There are 3 combination tumblers in the plug. They are positions 6, 7 & 8. The tumblers are also different than the door & hatch tumblers.

19. When you depress the retainer you can slide the cylinder plug out the front of the assembly.

MAKING FIRST KEY



21. WARNING: Some early versions of the ILCO & CURTIS Metal-head keyblanks were not made to OEM standards and do not go all the way into the door locks; they stop short by about .040". The angle on the tip is wrong.

Use the Jet keyblank H75 to progression the ignition; the Ilco blanks are not milled back far enough to work properly in the ignition.

Method #1

Use the Ford 8-Cut Determinator(tm), available from National Auto Lock. (Remember to follow M.A.C.S)

Method #2

Use tryout keys: American Tolkey & Die DTO #08, Aero Lock TO-82 for the doors and then progress the last 2 cuts.

Method #3

Remove a door lock or hatch lock and decode to determine the first 6 positions. Then disassemble the glove box for the last 2 positions.

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NGS KEY PROGRAMMING



22. Plug the NGS into the computer port (OBD2) next to the hood release.



23. Cut a H86-PT or H74-PT key with the correct mechanical cuts. Insert the key into the ignition and turn to the "Run" position.



24. Here are the instructions for the NGS.

- 1). Select "SERVICE BAY FUNCTIONS". Press the Trigger button to select.
- 2). The next menu should now appear, rotate the wheel to scroll down the list until you find "PCM -POWERTRAIN CONTROL MODULE". Highlight it & press the Trigger button.
- 3). The next menu should now appear, select the "ENTER SECURITY ACCESS". Press the Trigger button to select.
- 4). The next menu should now appear, use the wheel to highlight the vehicle that you are programming keys too.

Press the Trigger button to select. Not all vehicles are listed in this version of the software. If your vehicle is not listed select a different one and press Trigger.

5). The next menu should now appear, it may only appear for a second or two. Do not press any buttons on this menu.

6) The next menu should now appear; it should stay like this for about 10 minutes. Do not press any buttons on this menu.

7). To **Program 1 New key** select: "IGNITION KEY CODE PROGRAM" and press the Trigger button. Wait until the screen shows: "Key Code Programmed Successfully" > **Unplug the NGS Tester**, > **Remove the key**, > **Wait 3 Minutes**, > **Try the new key**.

8). To **ERASE all keys** you will need 2 New PATS keys. Select "IGNITION KEY CODE ERASE" and follow these instructions. Rotate the wheel to highlight the selection "IGNITION KEY CODE ERASE". Press the Trigger button to select. When the NGS reads the process is complete, You have 8 seconds to perform the following: (Do Not Wait)

- 1) Unplug the NGS Tester. Do not touch any buttons on the NGS tester.
- 2) Remove key #1.
- 3) Insert key #2 and turn to the RUN position for 1-2 second(s).
- 4) Remove key #2
- 4) Re-insert key #1 and turn to the RUN position for 1-2 second(s) and remove.
- 5) Wait 3 Minutes for the programming cycle to complete and then the vehicle should start.

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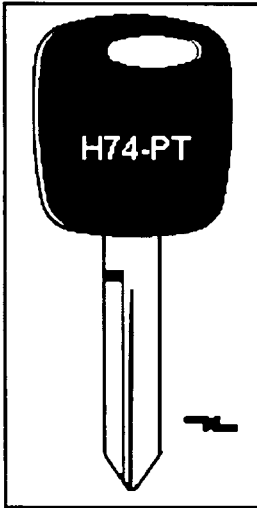
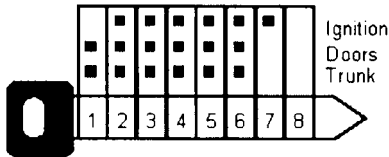
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O.I.D.06/03



Key Usage: All		Spacing: Standard		Depths							
Model Info: Ford PATS 2 Transponder System											
Bow	Spacing										Tip
1	2	3	4	5	6	7	8	9	10	11	Cut-to-Cut
0.845	0.753	0.661	0.569	0.477	0.385	0.293	0.201				.092
Code Series: 0001X-1706X											
HPC1200CM: CX101				ITL Mfgr: 522				M.A.C.S.: 2			
Pak-a-Punch: PAK-F3				Clipper Cam: FORD-5				Carriage: FORD-5			
Key Blanks											
Mfgr						Model Number(s)					
Ilco						H74-PT					
Ilco						H86-PT					
JET						H74-PHT					

Key Usage: All		Spacing: Framon		Depths							
Model Info: Ford PATS 2 Transponder System											
Bow	Spacing										Tip
1	2	3	4	5	6	7	8	9	10	11	Cut-to-Cut
0.405	0.497	0.589	0.681	0.773	0.865	0.951	1.050				.092
Code Series: 0001X-1706X											
HPC1200CM: CX101				ITL Mfgr: 522				M.A.C.S.: 2			
Pak-a-Punch: PAK-F3				Clipper Cam: FORD-5				Carriage: FORD-5			
Key Blanks											
Mfgr						Model Number(s)					
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OMNILOCK OP 2000



by
Richard Allen Dickey

Prox technology has arrived at OSI Security

OSI Security Devices was founded in 1986 in Sunnyvale, California. They have always been an expert in the field of battery operated, standalone access control devices. In fact, OSI Security Devices was the first to develop a battery operated standalone access system. OSI manufactures the OMNILOCK access control product line and remains a leader of standalone access control technology.

The OMNILOCK 2000 Series locks, partnered with a PocketPC® provide complete access control systems that requires no wiring. This eliminates the high cost of installation associated with hard-wired access control systems.

The newest addition to the 2000 lineup is the OP2000. The OP2000 is based on HID Prox technology. Along with the standard keypad (see photograph 1) access, a prox card or prox button can be used for access. (See photograph 2.) The Bit formats accepted are 26 bit, 32 bit OEM, 35 bit OEM, 37 bit, and Corp 1000.

OMNILOCK 2000 Series locks allow up to 2000 users per lock and



1. Here is the OP 2000 as viewed from the top. The keypad and LED indicators are visible.

provide up to 80,000 cycles on four AA batteries. It is fully programmable through the use of a hand-held Windows CE® or PocketPC® device. The 2000 series can provide an audit trail of up to 50,000 transactions per door, including key bypass or tampering.

The OM2000 magnetic card reader and the OP2000 HID proximity card reader systems are managed by the OMNILOCK Facility Manager (OFM), a powerful Microsoft Windows® compatible database program which allows control of 65,000 individual users.

The OP2000 is available as a Cylindrical, Mortise, Wall Mount (controls electrified hardware), Quick Adapter (retrofits to existing "D" series cylindrical locks) and Exit Device trim.

Photograph 3 is a front view of the OP2000 with an exit device adapter installed. Photograph 4, shows the back side with the same adapter. The model number and serial number can be seen on the bottom edge of the lock body. (See photograph 5.) The standard color is storm gray, but it is available in black as well.

What type of certification does the OP2000 have? Well, the lockset conforms with ANSI Standard 156.2, Series 4000, Grade 1 requirements. It conforms with Federal Specs. FFH-106C, Type 161. The lever handles comply with "The Americans With Disabilities Act of 1992". It is listed to UL Standard for fire (90 minutes) by Underwriters Laboratories Inc. and is Year 2000 Compliant.

Before the 2000 series can be used, the batteries must be installed and a system test should be done. This part only takes a minute and I will cover the steps briefly.

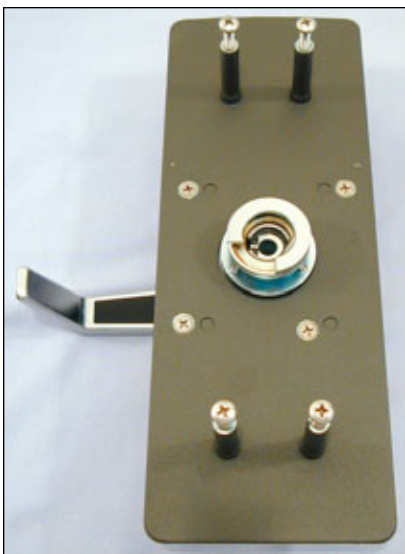
To remove the battery cover, the weather gasket is folded over and a single screw is removed. (See photograph 6.) The four AA batteries must be installed from left to right, all pointing in the same direction. (See photograph 7.) Now press the reset button and hold it down until the green LED on the keypad flashes, then release the button.



2. The OP 2000 can be opened with the keypad or with a PROX card.



3. Here is the front of the OP 2000.



4. This OP 2000 has an adapter plate installed so it can be used with an exit device.



5. When the lock is viewed from the bottom, the model and serial number can be seen.

At this point the system goes through a self test and the green LED will flash 5 times. If you get a red flash instead of a green one, that means there is a problem with the circuit card or the motor drive. Green means go, so all that you have to do is replace the cover and gasket to complete this step.

There are several exit device adapter plates to choose from. They are attached to the back of the lock body with four screws. (See *photograph 8.*) With the tailpiece inserted, the outside portion of the lock is ready for installation.

Everything to this point is very typical when you look at the turn towards electronics in the industry. However, the next part is very interesting. The software used with this system is called the OFM (OMNILOCK Facility Manager). It is a powerful Microsoft Windows® compatible database program that can manage in excess of 65,000 individual users.

Is that the interesting part? No, it's not! The interesting part is that even though the software is easy to

use if you are familiar with a computer, the people at OSI will set up your system and show you how to use it. No, they don't fly out to your business, they do it over the Internet. Well how do they teach you to use the software if they are in California and you are somewhere else? This is the interesting part!

With your authorization, an OSI programmer can gain remote access of your computer, as you sit back and watch the mouse fly across your screen. They see exactly what you see and they can explain each and every step while you watch.



6. The batteries must be installed before installation of the adapter plate.

Can this really work? I wanted to find out, so I called OSI Security to find out.

The first thing I had to do was visit their web site at <http://broker.desktopstreaming.com/h/osi>. Once you do you will see is a notice stating that there are online representatives to help you. (See *photograph 9.*) Just type your name and company into the box and click the "Click Here" button.

The next screen will inform you that a representative will be with you

Continued on page 50

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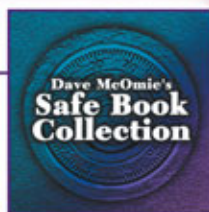
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• Every McOmie File published by the NSO which gives you all the known opening methods on virtually every important safe lock made, mechanical and electronic, with X-ray views; • Every article Dave has written for **The National Locksmith** from when he started in 1986 right up to 2000. (NSO members call for special pricing)



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Over 100 specific photographs. Fifty clear illustrations. Dozens of specific drill points and a special and a special drill point locator, over 140 pages. Available in two formats, book or CD-ROM.

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Chapters include: terminology, blanks, tools, removing cores from stubborn shells, decoding cores, pinning, record keeping, installing, planning a system, masterkeying, billing and pricing tips for success. You'll even receive a final exam to help and test your knowledge! This volume contains over 140 pages of priceless information, designed to make IC core work quick, easy and profitable! Available in two formats, book or CD-ROM.



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New features: Now updated to include the new models. Parts Locator... do reverse searches. Enter a part number and a list of vehicles appears organized by make, model and year. Color photos of parts... the Parts Locator not only shows you all the data, but also a color photo of the part. Service Help... now on selected models full service article with color photos and step by step instructions walk you completely through every job you might do on the car. Additional updates will contain ever more service articles and models. AutoSmart Advisor™ software tells you every scrap of information about the vehicle, all parts, costs, labor times, calculates your charges automatically, and shows you how to do the job!



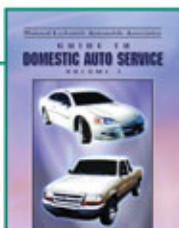
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This 184 page service manual shows great detail on the following makes and models of cars... • 1999 Dodge Caravan • 1999 Ford Police Interceptor • 1999 Jeep Cherokee • 1999 Pontiac Grand Am • 1999 Pontiac Montana • 2000 Ford Ranger • 2001 Dodge Stratus • 2001 Chrysler PT Cruiser • 2001 Oldsmobile Aurora • 2001 Pontiac Aztek. Each of the cars is covered with dozens of photos, and loads of text to walk you step by step through everything you could possibly have to know about the vehicle. You get car opening, lock removal and service, column service, key code series information, and many views of the doors, panels and locks.

NOTE: NLAA members will already have received these materials.



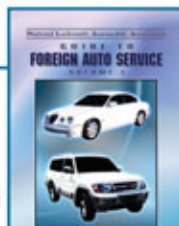
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CD VERSION Item #NLAA-ForCD • \$45.00

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NOTE: NLAA members will already have received these materials.



The National Locksmith Guide to Motorcycles Volumes 1 & 2

Vol. 1 CD VERSION

Item #MOT-CD • \$99.00

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Item #MOT-CD2 • \$99.00

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Item #MOT-CD12 • \$149.00

Vol. 1 PRINT VERSION

Item #MOT-1 • \$99.00

Vol. 2 PRINT VERSION

Item #MOT-2 • \$99.00

Both Volumes in PRINT Item #MOT-12 • \$149.00

For years locksmiths have begged for a comprehensive service manuals on motorcycles, and they are finally here! Covering a wide range of service procedures, you'll know everything a locksmith needs to know about each cycle. Plus, you'll get step by step photographs and instructions. Both volumes available in two formats, book or CD-ROM. Special pricing if you order both.

If you have ever been frustrated by cycles made by the following manufacturers, you'll need these comprehensive books: • BMW • Buell • Harley-Davidson • Honda • Kawasaki • Neiman • Suzuki • Triumph • Yamaha • Zodi



Locksmith Dispatcher 2000

Call for versions available & price information.

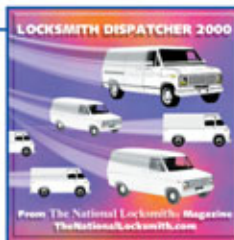
Controlled Service dispatching software specifically for the locksmith.

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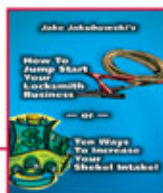
Versions available for both small and large shops.



How To Jumpstart Your Locksmith Business or Ten Ways To Increase Your Shekel Intake

Item #JUMPSTART • \$19.95

Anyone who's ever read anything that Jake Jakubowski has written is familiar with his style... A little bit of humor, a little bit of "down home" wisdom and a whole lot of chutzpah. This book is just as witty, wry and pointed as everything else he had written. There's something in this book for the newbie, the seasoned 'smith and the person that's dreaming of the day when they can go out their own. "How To Jump Start Your Locksmith Business" is vintage Jake. His advice on money making, building your business and customer relations is timeless... At \$19.95, this CD version of Jake's newest book makes it one you can't afford to be without!



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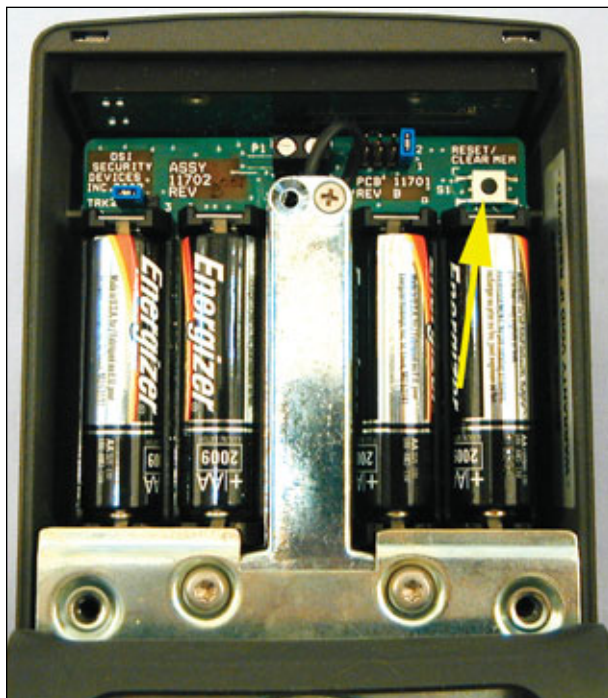
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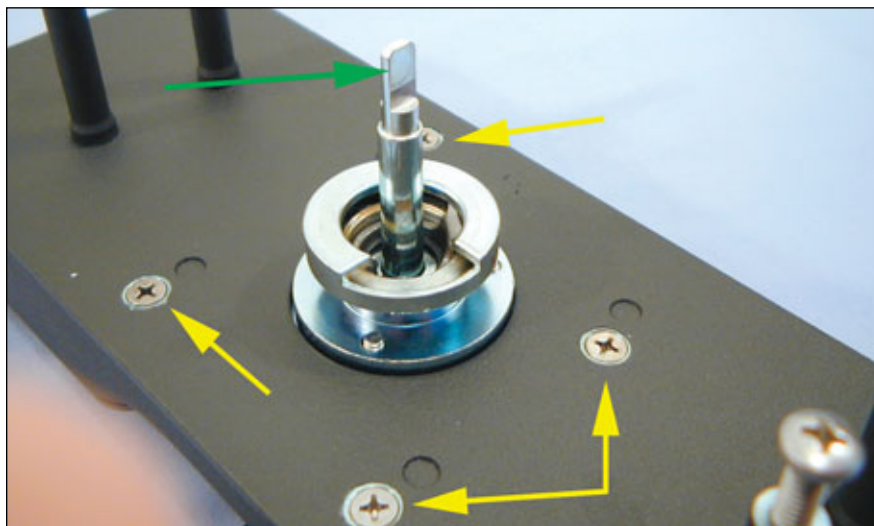
Continued from page 47

soon. (See *photograph 10.*) It's kind of like being on hold with your telephone, but different. Once your representative is online, they can show you anything that you would like to see. I was lucky enough to have Rick Rasmussen on the other end and he was able to give me a great presentation of the software.

One of the first things we looked at was the facility explorer. (See *photograph 11.*) Here I have a facility called "Denver" with two buildings in the facility. In building 137 there is one lock called "Main Entrance."



7. With the cover off, the batteries should be installed all in the same direction, from left to right.



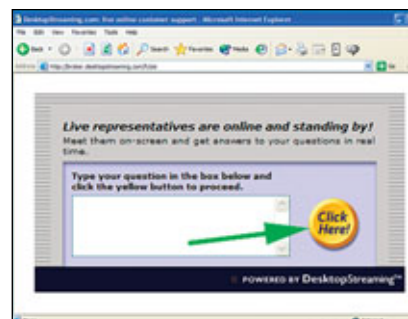
8. With the battery cover replaced, the adapter plate is installed with four stainless steel screws.

When you view the properties of the facility, you are able to set up the code ID length, pin length, prox reader configuration, etc. (See *photograph 12.*) There is even a screen that will allow you to automatically adjust for daylight savings time. Rick was able to modify these screens from California while I watched the computer monitor in Arkansas.

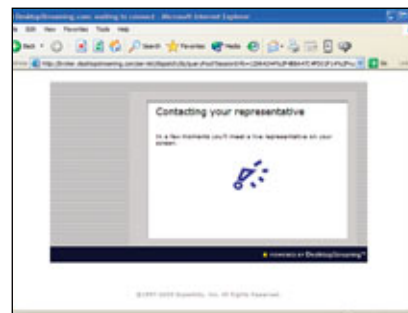
While I was still in the facility explorer, Rick showed me information about the lock by choosing "properties" from the "edit" menu while the lock was highlighted. The General information tab is where you enter the lock name, open delay time, date installed etc. (See *photograph 13.*)

Changing to the "User Enrollment" tab, you can see all of the users that are pending enrollment for this lock. (See *photograph 14.*) You can tell that they are pending because of the "P" that is in the yellow circle just to the left of the name.

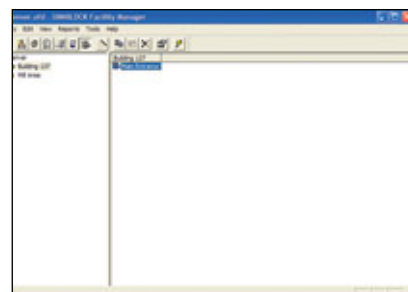
When the "Status" tab is chosen, you can tell if the lock is pending programming, the number of users enrolled, battery condition, etc. (See *photograph 15.*) In



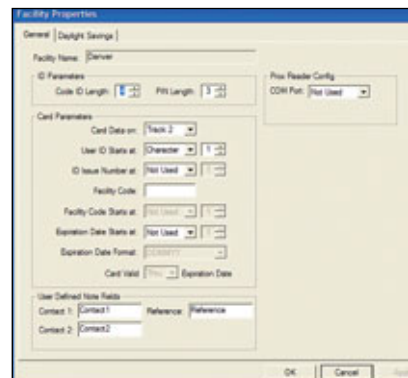
9. Your programming can be completed for you over the Internet.



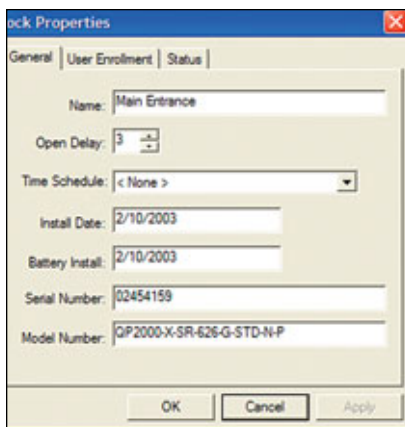
10. While you are waiting for assistance, a screen lets you know you have not been forgotten.



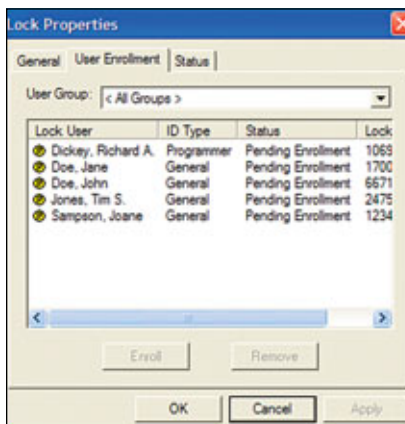
11. Each facility can have multiple buildings and each building can have multiple locks.



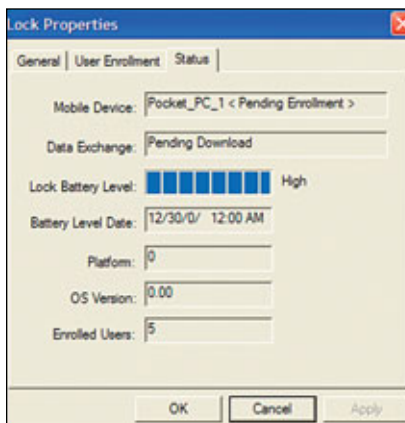
12. The properties of each facility will determine all code lengths and types as well as other options.



13. The lock properties have three sections. The first shows information about the lock.



14. The second shows information about the users.



15. The third shows the status of the lock.

this case we are pending download, so the battery information is at the default level of high.

Without getting to deep into all of the steps involved with the actual process of transferring the information from the computer to the lock, I want to show you the device and then show you what the computer software will tell you after the transfer is complete.

The lock information is transferred from the computer to the lock with a hand held PC. (See photograph 16.) This one is made by Hewlett Packard and uses Microsoft software. An infrared light is used to communicate between the hand held PC and the lock. By clicking on "Lock" (see photograph 17) and then "Access Level" you are taken to a new screen that actually does the data transfer. (See photograph 18.)

As you can see, the hand held PC is waiting for a connection to the lock. When the programmers code is entered on the lock keypad, a connection is established. When the data is transferred, the hand held PC can be re-synchronized with the computer software and the lock programming can be reviewed.

This time, when the lock properties are viewed, the data exchange shows "current" and the battery level and date are the actual readings from the lock. (See photograph 19.) When the user enrollment tab is selected, the yellow circle with the "P" is replaced with a head to show that it is no longer pending. (See photograph 20.)

The OFM (OMNILOCK Facility Manager) is a very powerful program and was well thought out when created. Time schedules (see photograph 21) and holidays are easily created and modified. (See photograph 22.) There is a lot of flexibility when using the audit report. You are able to select a report for an individual user or select all users. (See photograph 23.) You are also able to select the type of event that the report will display. (See photograph 24.) The reports that are displayed are very professional and include lock information (see photograph 25) user information (see photograph 26) as well as lock activity. (See photograph 27.) This is only a small part of the capability of the OFM. Now I want to show you a list of the features that are available from the 2000 series. Check this out!

Key Benefits

- Capacity of 2000 individual users per lock
- 25000-event Audit Trail (including key-cylinder bypass)
- Microsoft Windows® CE or Pocket PC Device (WP4000 no longer required)



**QUALITY
MANUFACTURED
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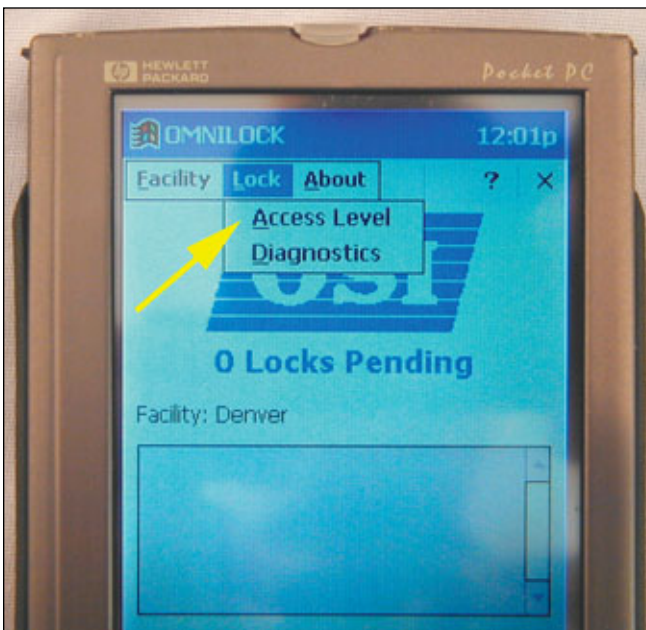
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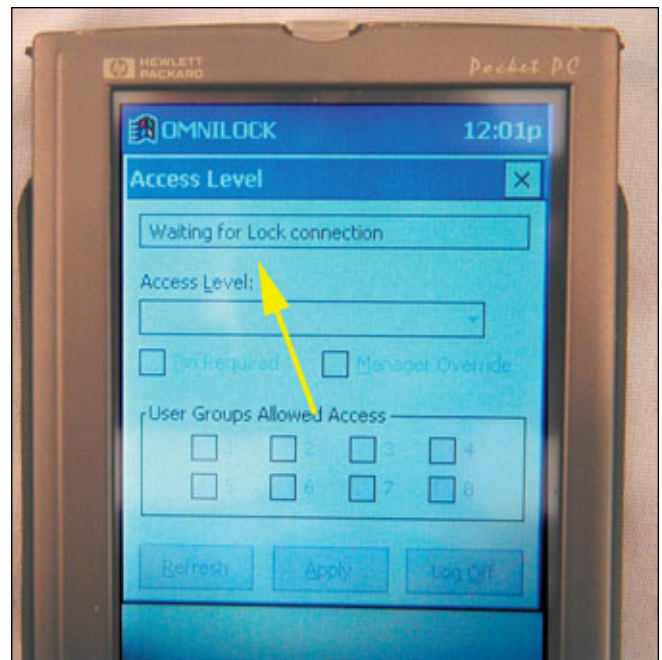
16. A pocket PC's is used to transfer information to and from the lock.



17. Access to the lock is gained by advancing to the "Access Level" window on the hand help PC.

- The OM2000 system lock consists of a rugged control module coupled

access for user groups automatically at preprogrammed times. May be



18. A connection is established by entering the programmers code on the lock keypad.

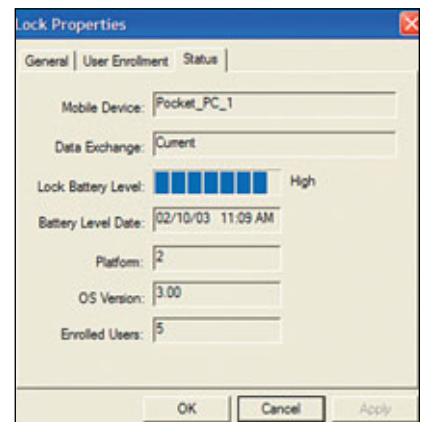
to a heavy duty Grade 1 lock body

- Bi-directional infrared communication allows rapid programming, auditing, or system diagnostics
- Flash ROM allows lock software upgrades via infrared
- Electronic and electromechanical diagnostics can be run without removing lock from door

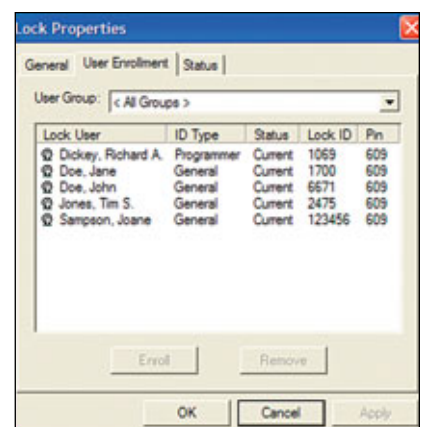
- INTERNAL CLOCK has a Resolution of 1 minute per year with leap year correction.

- Daylight Savings: Automatic or manual corrections.

- TIME SCHEDULE Sets Access level and/or controls

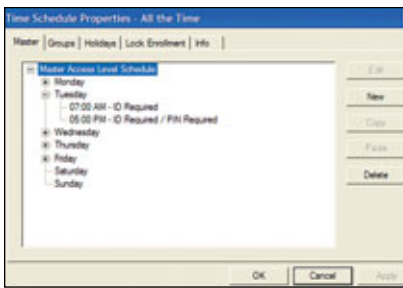


19. After the lock is programmed current information about the lock can be displayed.



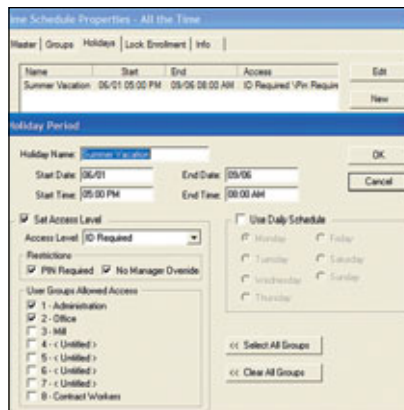
20. User information is no longer displayed as pending.

easily preprogrammed for automatic holiday scheduling. Time scheduling allows up to 144 daily access-level changes per day and 32 annual holiday periods



21. Time schedules can be set up in numerous ways.

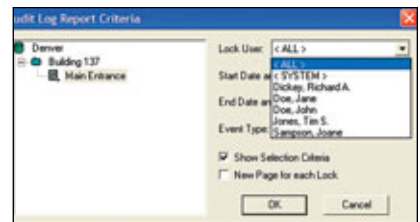
- Available in both cylindrical and mortise or mortise-with-deadbolt configurations
- Electronics easily retrofit to OMNILOCK, OM100, OM300, and OM500 series lock hardware
- Case-sensitive password-protected software
- Anti-tamper: Initially set after 3 consecutive invalid code entries. Additional key presses ignored for 10 seconds.
- Terminals provided for lock activation by a remote switch
- Keypad: Durable Plastic Buttons Each number is molded through. Keypad Codes 4 to 10 digits in



22. Holiday periods are also very flexible.

length, and PIN lengths 4 to 6 digits

- Function: Lever retracts latchbolt from either side unless the outside (cylinder side) is electrically locked. Unlocked from outside with valid ID, valid card, or by key. Inside always free passage.
- Installation: Standard ANSI 161 door preparation for cylindrical lockset with 2-3/4" backset and door jamb not greater than 3/4". Two anti-rotation holes are required.
- Temperature: 0 to 54 C (32 to 129 F)



23. Audit information can be on an individual user or all users.

- Exposure: Occasional splashing or spray of water on keypad is acceptable. (Not warranted for outdoor use).
- Lock Body: Heavy duty Grade 1, made in USA. Available in Cylindrical (Schlage® or Arrow®)
- Dimensions Height: 7.45", Width: 3.81", Depth: 2.34" (Upper) - 0.78" (Lower)
- Material: Cold rolled steel and zinc dichromate finish for oxidation resistance with precision cast steel retractor. 2-1/8" diameter bore is required.
- Latch: 2-3/4" backset standard, brass with 1/2" throw. Housing is steel-zinc dichromate finish for oxidation resistance. 1" diameter bore is required.

The National Locksmith®

on CD!

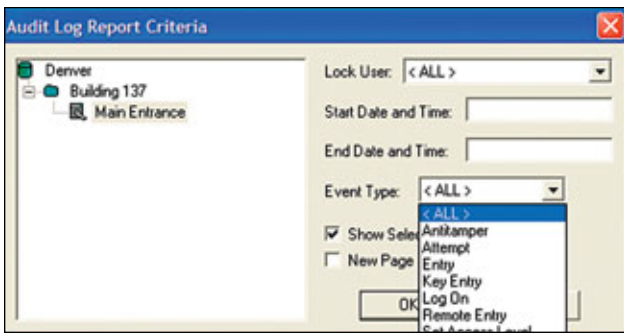
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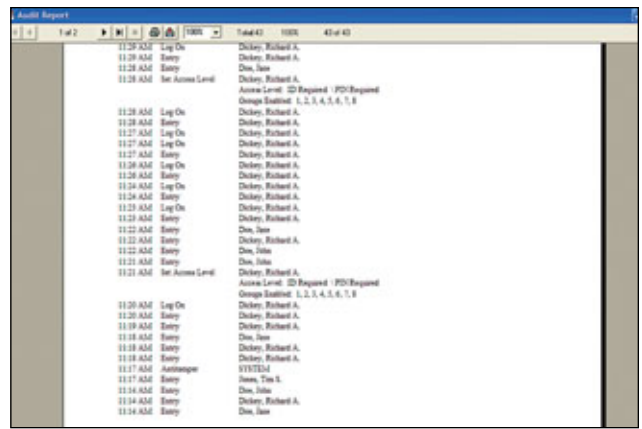
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Signature _____
Your Name _____
Shop Name _____
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City _____ State _____ Zip _____
Phone _____

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P.O. Box 77-97592 • Chicago, IL 60678-7592

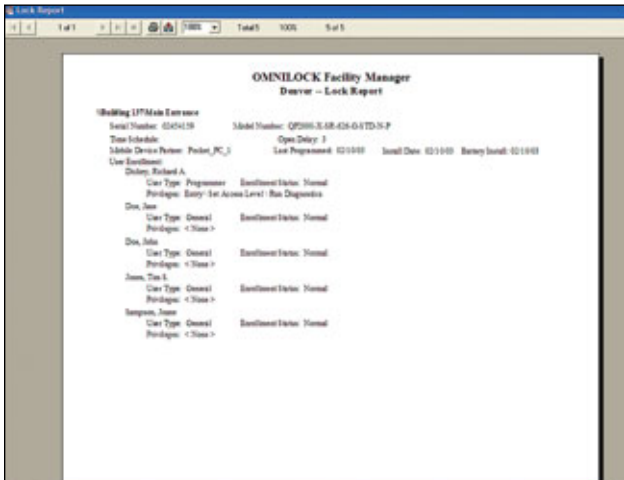
OID 03/04



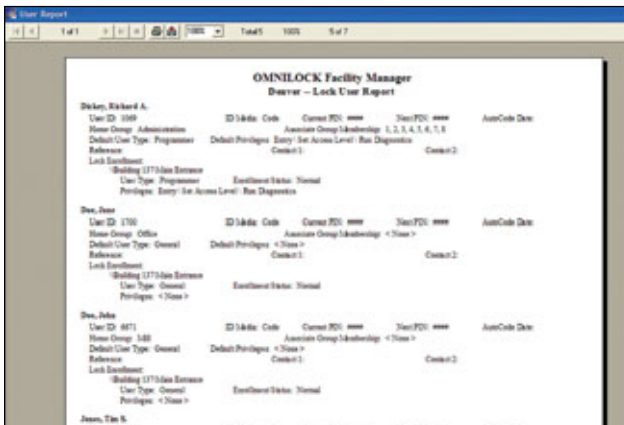
24. There are also several types of events to choose from.



27. Audit reports can also include extensive lock activity information.



25. Here is a sample lock report.



26. Here is a lock user report.

- Latch Face: Cylindrical 2-1/4" x 1-1/8". Mortise 1-1/4" X 8". Brass, bronze or stainless steel face plates.
- Strike Plate: Cylindrical 1-1/4" x 4-7/8" ASA strike. Mortise 1-1/4" x 4-7/8" ASA strike. Brass, bronze, or stainless steel each with 1-1/4" lip-to-center dimensions. All meet ANSI Standard A115.1.
- Handing: Field reversible. Shipped right-hand.
- Door Thickness: 1-3/4" standard. Available for up to 6" door thickness.

Privileges are assignable. Quantity as required.

- MANAGER ID can enables or disables User Groups, sets Access Levels, privileges are assignable
- GENERAL USER ID Allows access when access level is set to ID Required and user group is enabled. Quantity is 2000 users less the Programmers and Managers
- FACILITY CODE ID Allows common area entry to all cardholders when enabled. Quantity

- Key Cylinder: Solid brass 6 pin cylinder with two brass keys. Keyed 5 pin with Arrow 'CS' keyway. Mortise cylinders 1-3/4".
- I/C Core: Small or Large available. For use with 6 or 7 pin I/C cores (I/C core not included).
- Trim: Through-bolted with independent spring cassettes for each lever.
- Finish: Durable storm gray powder coat, Black epoxy powder coat and 626-US26D (Satin Chrome) Optional

unlimited with no audit.

- SERVICE ID includes an ID plus PIN, assignable to short-term users

ACCESS LEVELS

- Level 2: Free passage - unlocked.
- Level 3: Remains unlocked after first valid ID
- Level 4: Remains unlocked after first valid ID and PIN
- Level 5: Enrolled ID required
- Level 6: Enrolled ID and PIN required
- * Level 7: Facility ID card required
- * Level 8: Lockout -Manager or Programmer only allowed

AUDIT LOG

- * Audit reports can be reviewed or printed for individual users, individual locks, user groups, or entire facilities
- * Transactions: Retains last 25,000 events, whether keypad, magnetic card, Prox card or key fob, key bypass detection, or time-schedule-automated
- * Variable: The audit trail may be increased by reducing the number of users
- * Events Audited: Ten separate events are recorded, including key bypass, tampering, or unauthorized attempts

For more information contact OSI at: 1580 Jayken Way, Chula Vista, CA 91911. Phone: (619) 628-1000; Fax: (619) 628-1001; E-Mail: sales@omnilock.com, or techsupport@omnilock.com. Circle number 354 on Rapid Reply.



National Auto Lock Service, Inc.

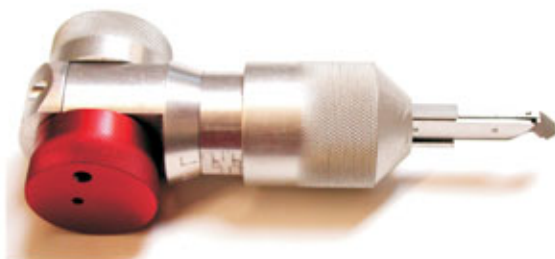
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High Security Lock Decoders

This new tool from Laserkey Products will decode High Security door locks in just a couple of minutes. I was able to decode a Bug door lock in no time and very accurately. Works great and a real jewel of time saver. Comes with color instructions and key grids and hard shell carry case.



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Original factory ignitions for the Focus, Escape & Tribute. These are the original equipment lock cylinders for the ignition. They fit the Ford Focus, Ford Escape and the Mazda Tribute.



These are complete service packs with tumblers, springs and tumbler spring cap.

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Transponder systems in cars threatened to take the locksmith out of the business of making car keys. Besides the official car manufacturers' machines which are very expensive and sometimes difficult to obtain. We believe that the TCL-1 is by far the best value for the money for this type of machine.



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We can "Re-Flash" the immobilizer chip in the ECM module so it will accept new transponders keys when there are no keys available or just a valet. All Models!

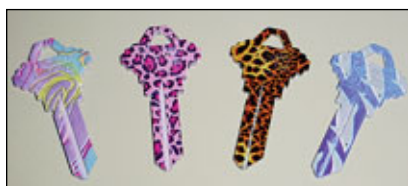
- > No chip removal
- > No soldering involved
- > 3 Keys Included



The price for this service is **\$150. + \$35** returnnext business day shipping by FEDEX



When the first designer pattern residential key blanks came out just a few years ago, Bob DeJonge (now the president of Klassy Keys) took notice. Like many other locksmiths, he saw the potential market for them. He thought that the original groups of designer keys were a bit pricey, but that the public would probably like them. Bob didn't originally plan to



1. Schlage animal print patterns.



2. KW1 flower patterns.



3. Colorful KW10 key blank patterns.

involve himself in the manufacture or import of creative key blanks, but after being approached by Albert Duenyas, he did. Albert had connections with people overseas that were looking to develop a line of key blanks that might catch on in the American market. Talks ensued and plans were developed.

It really wasn't until Bob's son Dan, who was rather talented in art and design, came up with more than a dozen attractive key designs representing Americana. That unique character is what would soon become Klassy Keys. Many of the original patterns shown to Bob had more of an European flavor. Dan's designs were aimed more at the tastes of the American public, and hence were the origin of the American Classic Collection. They ultimately decided to manufacture those key blanks, but to sell them directly to the locksmith.

The American Classic Collection started out with 19 different key patterns in four relatively common residential keyways. The keyways are: KW1, SC1, WR5 and KW10. I've broken down the 19 patterns currently available and divided them into groups by themes of my own choosing.

Photograph 1, shows four animal print patterns in the SC1 keyway. From left to right are: Rainbow Zebra (502), Pink Leopard (520), Tiger (521) and Dolphins (522). There are two flower pattern KW1 keys in *photograph 2*. On the left are Flowers (525), and Sunflowers (560) on the right.

The KW10 key blanks in *photograph 3*, have some rather



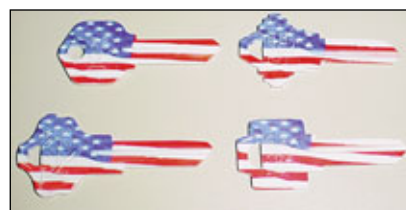
4. Camouflage, shooting stars and hugs & kisses.



5. Sports examples on SC1 Blanks.



6. 70's theme KW1 blanks.



7. The American flag in all four keyways.



8. The KW1 American flag.

interesting colorful patterns. Stained Glass (503) is on the left, and Gum Drops (504) is on the right. The patterns on the WR5 blanks will likely split along male and female lines. (See *photograph 4*.) From left to right, they are: Camouflage (545), Shooting Stars (555) and Hugs &

Kisses (550). My guess is that the Camouflage will tend to appeal to the outdoorsmen and hunters while the Hugs & Kisses design will have a lot more female appeal. I think that the Shooting Stars pattern will have broader appeal among both males and females.

The next group is sports with 5 different patterns of SC1 key blanks (See *photograph 5*.) From left to right, they are: Football (510), Basketball (511), Baseball (512), Soccer (513) and Golf (514). I'd call the next group nostalgia. The two KW1 key blank patterns in *photograph 6*, make me think '70s themes. On the left is Smiley Faces (551) and Peace (552). I'm going to guess that a certain best seller will be the American Flag (501) pattern shown in all four available keyways. (See *photograph 7*.) A close-up shot of the KW1 version can be seen in *photograph 8*. The other brands of designer keys have their own pattern variations, but all have some form of American flag pattern

The flash from my camera seemed to wash out the colors a little bit and on computer display the colors seemed a bit light. When you see the actual keys, you will probably find the colors deeper and richer than reproduced in the photographs (especially the blues). They are very attractive keys. You will no doubt have your favorites and others that have limited appeal to you, as will occur with your potential customers.

Although there are 19 patterns available now, 5 more patterns are slated for release by July. My 8-year-old son (who will be 9 by ALOA) observed the lack of hockey in the sports assortment. While hockey isn't popular everywhere, it is in Hockey town (Detroit area). I have been assured that Hockey is one of the patterns to be released in July, along with some more animal patterns and others not identified.

Purchase Plans

Key blanks will be sold directly to locksmiths. The best prices will go with the Dealer Key Rack Programs, which will require a minimum purchase of 1000 key blanks assorted as you choose them. Program dealer pricing will make the KW1, SC1 and WR5 blanks available at 65 cents a piece and the KW10 blanks at 70 cents each. That

may seem a lot until you realize that most of the other brand designer keys are over a dollar each. Non-Program dealer pricing requires a minimum of 100 assorted keys with a slightly higher price. KW1, SC1 and WR5 blanks are 85 cents in this program, and KW10 blanks are 95 cents each.

You can be somewhat creative to get the better price break by using the buddy system and split a 1000 plus order between you and other locksmiths. Afterward when you re-ordered, you would get the 65 and 70 cent prices with minimum re-orders

of 100. You can choose your own pattern assortments, but you must order minimums of 10 each of any patterns. You can pay by check, money order or COD. You can also order by credit card with either MasterCard or VISA (but not with American Express, as they always say in those commercials).

For more information, contact Klassy Keys at (888) 844-KEYS(5397). Fax: (800) 610-6670. Web: www.klassykeys.com Circle number 355 on Rapid Reply.

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Free Literature & Brochures

To keep abreast of the latest product additions, omissions, or updates, most manufacturers and distributors make available product catalogs and brochures, which is free for the asking. To keep your library of information current, the following are some of catalogs and brochures available.

Clark Security Products Catalog

Clark Security Products' 2002 full product line catalog is a great reference tool for all Security Professionals. The catalog is made up of 1,832 pages



representing over 350 manufacturers and 35,000 items. It contains application guides, ordering charts, detailed images and descriptions, cross references, and much more.

Toll Free #: 800-889-5625

Phone: 858-505-1950

Fax: 858-974-5298

Website: www.clarksecurity.com.

Detex Corporation Loss Prevention Products Brochure

For life safety or security that starts at your door, open Detex's Loss Prevention Product Line Brochure. This new full color brochure features many security door hardware products that are known as standards in the industry as well as new products that have been designed to set new standards for durability, reliability and affordability.



It contains information on door hardware field-proven for loss prevention with regards to life safety, ranging from exit control hardware and exit alarms to mullions and accessories. Product features, benefits, operation and certification/standards compliance also included.

Toll Free #: 800-729-3839

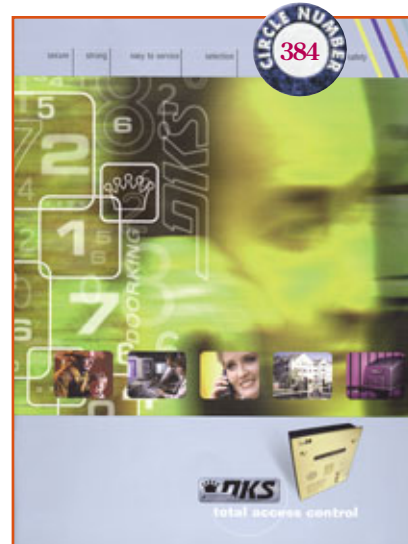
Fax: 800-653-3839

Web: www.detex.com

E-mail: marketing@detexcorp.com

DoorKing, Inc Catalog

DoorKing, Inc. is a leading manufacturer of innovative products for the access control industry. They manufacture a variety of PC programmable Telephone Entry and Multi-Door Card Access Systems, Telephone Intercom Systems, High Security MicroPLUS™ RF Transmitters and Receivers, Digital Keypads and Vehicular Slide, Swing and Barrier gate operators. Our product offerings include a complete line of Magnetic and Electric locks, Proximity Card Readers and a variety of access control accessories.



Toll Free #: 800-826-7493

Phone: 310-645-0023

Fax: 310-641-1586

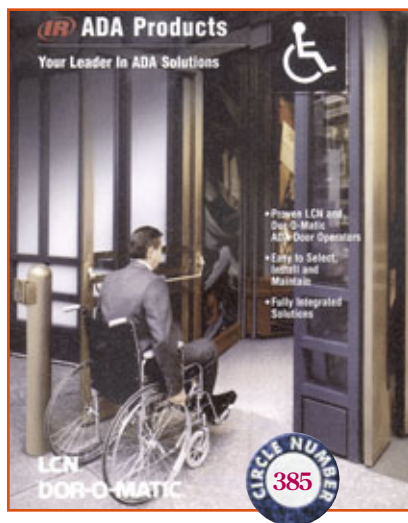
E-mail: info@doorking.com

Web: www.doorking.com

Continued from page 58

IR Security & Safety Brochure

Now available from IR Security & Safety is a new brochure that features a selection of four distinct low-energy door operators designed to provide fully integrated solutions to ADA door accessibility requirements.



The brochure includes the LCN® 4600 Electric AutoEqualizer™ and 4800 Pneumatic AutoEqualizer power operators, used for primarily manual openings with available push button assist, and Dor-O-Matic® Senior Swing™ and Benchmark power operators for primarily automatic openings.

In addition to comparing the features and benefits of these products, the new brochure includes many other IR accessories designed for ADA applications, including a section of hard wired and wireless (RF) actuators, motion sensors, bollard posts and more.

Additional information and a copy of the new ADA Total Solutions brochure may be obtained through IR distributors or from IR Security & Safety.

Toll Free #: 800-526-2400

Fax: 800-248-1460

Website: www.lcnclosers.com

Markar Architectural Products Catalog

Markar announces its new 3-in-1 catalog. The first section includes over seventy standard continuous

hinge models for new and retrofit applications. Custom modifications and colors are available. Other products include continuous edge guards, hinge shims and pivots.



The second section in our catalog, "Ten Steps to Success", details the features of the Markar FRP Solution Door, an integrated door system that provides the installer with adjustability and durability due to its state of the art design.

Last but not least is our line of lite kits and louvers manufactured from galvanized steel for maximum resiliency. A vast array of door components, astragals, glazing beads and more are available.

Toll Free #: 800-866-1688

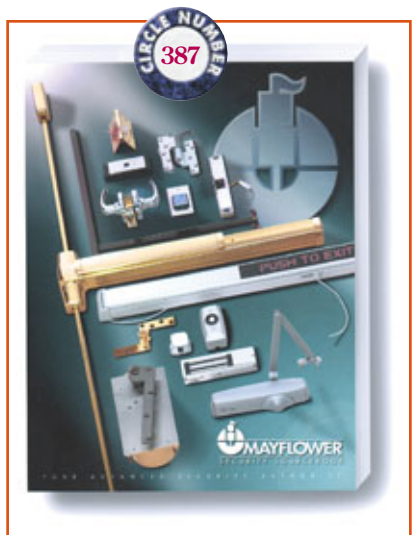
Phone: 716-685-4104

Fax: 716-685-3919

Website: www.markar.com

Mayflower Catalog

Detailed information on a huge range of access control products as well as builders and architectural



hardware is contained in the new catalog just issued by Mayflower Sales. The catalog has been years in preparation to insure thorough accuracy and completeness.

The nation's outstanding manufacturers are represented with products such as electric strikes, locks, hinges, closers, alarms, exit devices, door controls, electrified locks, electromagnetic locks and switches, ID systems, plus thousands more. General industry information as well as specification data, operational characteristics, finishes, functions, accessories, options, application data and ordering details are included.

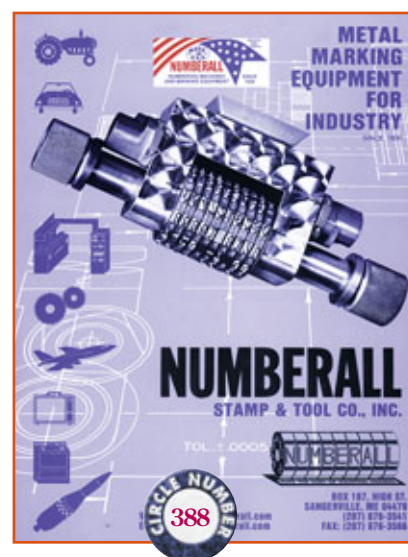
Toll Free #: 800-221-2052

Fax: 718-789-8346

E-Mail: pilgrim@msafes.com

Numberall Stamp & Tool Co., Inc. Catalog

Numberall Stamp & Tool Co., Inc. has a free 34-page catalog outlining all types of metal marking equipment. Included with every catalog is a FREE Length of Impression Ruler, and complete price lists. The Length of Impression Ruler is a versatile aid in determining character size and number of characters.



The catalog has several pages dedicated to character styles and character data. The next 31-pages show and describe various type of marking equipment. Numbering heads, hand held and press mount, hand stamps, type and typeholders, numbering and letterpresses and

small bench presses. There are also numerous other types of marking equipment.

A unique questionnaire also included will aid Numberall sales personnel in quoting the proper equipment for your application. There is a lot of information required for quoting. This questionnaire eliminates numerous telephone calls.

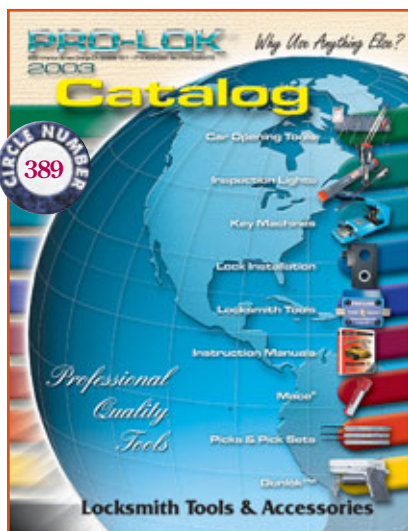
Phone: 207-876-3541

Fax: 207-876-3566

Website: www.numberall.com

PRO-LOK Catalog

PRO-LOK is the leading manufacturer of Auto Entry Tools, full color Car Opening Manuals, Inspection Lights, Installation Tools and Templates, Blue Punch Key Machines, Safe Bits, Gun Lock Products has a new catalog. With over 25 years in the locksmith industry, they have the experience and the staff to provide the quality products you want.



As the company has grown, their goal has not been to just maintain, but to actually improve the quality of each and every one of the products they make.

Phone: 714-633-0681

Fax: 714-633-0470

Website: www.pro-lok.com

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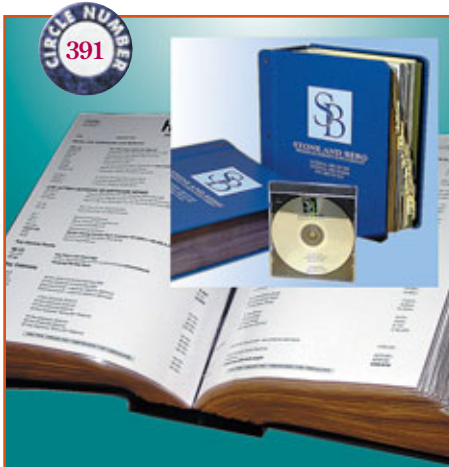
Phone: 323-846-6700

Fax: 323-846-6800

Website: www.mailboxes.com

Stone & Berg Catalog

Stone and Berg's Catalog System is an indispensable reference and sales tool created just for the locksmith. All individual pages are vinyl protected, case-bound, and updated three to four times a year. The Catalog contains current manufacturer supplied list pricing



(or dealer cost) and catalogs. The price book (also available on CD) is alphabetized by manufacturer and displays the item number, description, and manufacturer's list price on all products inventoried at Stone & Berg.

Manufacturer's logo is prominently displayed for quick visual referencing, and a symbol on each page indicates the locksmith's discount from the manufacturer's list price.

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.CG16-41R-1041R	.M10-92N-1092N	.WR4-54WA-A1054WB
.CG17/KP1-41Y-1041Y	.M11-92T-1092H	.WR5-54WC-A1054WB
.CG22-41RB-1041E	.M27/M16-92NR-1092NR	.WR6/FA2-F54A-A1054WC
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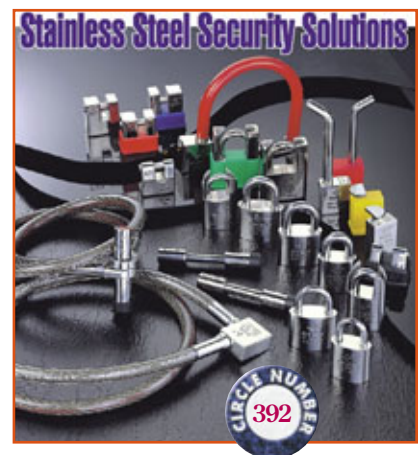
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W-LOK Corporation New Product Catalog

The new 2003 catalog contains 17 pages of high quality, high security 100% Stainless Steel locking devices. Every product page includes a full color in-use photograph, part numbers and descriptions/details of each item. And for the first time we have included a new test reference page.



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& Key Accessories

Every locksmiths store should not only be stocked with the necessary hardware and products required, but also impulse items as well. Keys and key accessories are prime examples of the necessary, and impulse items. If you want to increase your bottom line, this is a sure bet.

ANDREW'S GROOVY KEYS

Andrew's Wholesale Lock Supply has four exclusive Groovy Keys patterns from Jet, including Shamrock, Cards, Race Flag and Dice.



Keys are available in KW1, SC1, M1 and WR5 and are priced with attractive margins to help boost impulse sales. According to Andrew's, the keys cut cleanly and evenly so a locksmith doesn't have to worry about losing the pattern when a key is put on the wheel for deburring. Andrew's offers point-of-purchase displays for the keys.

For more information call: 800-544-0519 or 717-274-8733. Web: www.andrewslock.com

ILCO'S PERSONALI-KEYS™

Two years ago Ilco raised the key market to a new level with their introduction of Personal-keys™. Consumers are now able to make a colorful statement that reflects their individuality. There's a Personal-Key available for every personality with the wide and growing variety of key designs offered by Ilco. Choices range from animal print patterns to College logos and professional sports team logos.

Personal-Keys have found their way into some unique and non-traditional markets. Displays of these keys can be seen in beauty salons and sporting goods stores, and the potential markets are increasing as the consumer demand continues to explode.

This product offers a great opportunity for the innovative locksmith to enter into joint ventures with their local "boutiques". These retailers can display Personal-keys and offer exposure to clientele who would normally not visit the locksmith's shop. Traffic increases in

your shop when the customers come in to have their new keys cut. In return, work out a deal where you'll give the boutique a percentage (cash or bartered services such as re-keying their doors) based on the resulting increased traffic in your shop.



If you do residential work or have a store, and if you haven't already made the modest investment in a couple of Personal-Key displays, don't put it off. They've become a super hot item with consumers and Ilco continues to lead the way with innovative and exclusive patterns.

For more information call: 800-334-1381 or 252-446-3321.

JET GROOVY KEYS

Locksmiths are increasing their key cutting business with Jet Groovy Keys. They have discovered a product that people "want and must have," instead of the usual "must need" reason for customers to have keys made. And, when the customers get bored, they come



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Available for over 200 different car makes/models, the keys are

back and have keys duplicated on still another design.

New from Jet are five "Flip Over" key blanks featuring the basic Betsy Ross (U.S. Flag) on one side and a choice of five patriotic designs for the flip side. Four of the patriotic designs are the Statue of Liberty, Bald Eagle, Liberty Bell, and the flag rising at Iwo Jima. The fifth blank of the new series offers a USA ribbon on one side and a Yellow Ribbon on the flip. The Flip Over keys are available in KW1, KW11 and SC1 key blanks.

Jet currently has 21 designs for KW1, KW10/11, M1, SC1 and WR5 keys. Additionally, there are close to 10 exclusive special designs offered by Jet Distributors. Custom exclusive designs are available to distributors and for locksmiths through their distributors. Both the standard and exclusive designs may be viewed on Jet's web site.

All Groovy key blanks are precision made and coined by Jet. They are then shipped to Italy for final processing. They are finished with a special hard coat by experts in Italy. The company says Jet's Groovy Keys will not chip or flake while being cut.

Groovy keys are offered in various assortments or individual designs. Currently there are two flat counter or wall hung display racks. The CCC-50 (50 keys), CCC-200 (200 keys) and a new CCC-350 (350 keys) Groovy assortment that includes Jet's Squarousel rotary rack with expansion up to 96 hooks. Free large Groovy Key Signs come with the CCC-200 and CCC-350 assortments. Groovy Key Signs may be purchased separately. Wall and window posters are available.

For more information, go to: www.jetkeys.com.

LOCKMASTERS, INC. RECIGNITION KEY JEWEL PROGRAM

Lockmasters' "recIGNITION" Key Jewel Program is a totally unique program that provides OEM equivalent transponder and non-transponder keys with a unique

exclusively designed to accept "jewels" on both sides, and selected keys are also available in either clear or glow-in-the-dark in addition to the standard black. Choose from the 20 in-stock jewel designs or get a custom jewel design to promote your business. There is ample space on the jewel for a company logo and phone number and the jewels are easily applied to the keys. Lockmasters provide design service for custom jewels when you're looking for something totally exclusive to your business.

The program works well whether you stock dozens of different types of keys or just a handful—since the jewels will fit on all keys in the "recIGNITION" program. This allows you to personalize your entire key inventory regardless of size



without breaking the bank. A starter kit that includes 200 jewels (10 each of the 20 unique designs), a counter display board and sample key for the display is available at a very affordable price.

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PANNEX

by Door Control International

by
Jake Jakubowski



I've spoken before about the idea of how events seem to conspire to make things happen in a certain way. Of course, that's really predestination and few, if any of us believe that events are cosmically destined to happen-especially on a personal or business level. Yet, when Greg Mango called me and told me to expect a package from Door Controls International, little did I realize a chain of events had been set in motion that would terminate in a very satisfactory way.

When the package arrived, I opened it, looked the panic exit device that it contained over and thought, "Hmmm, another panic exit device." I made a note to find somewhere to install the device and decided that as soon as I had some spare time, I would study the info that came with the device and see if Door Controls International had a web site where I could pick-up a little more information.

The purpose of all this activity, of course, was to evaluate the device, install it and write an article documenting the installation and my findings regarding the PANNEX 1210, battery operated (9-volt),

alarmed
panic/exit device.

DCI, as it turned out, makes a complete line of Grade 1, high-security, rim exit devices. (See photograph 1.) DCI also makes flush bolts and coordinators (see photograph 2), bumpers and stops

(see photograph 3) and a line of electromagnetic locks (see photograph 4).

Consequently, one of the first things I noticed about the 1210, was its "heft". I have to say that if weight is any indication of quality, this was one well-made device.

The next thing that caught my attention was the unusual rotating latch. According to DCI, it is a patented feature on their line, which rotates to

Continued on page 68



1. DCI Grade 1 rim exit devices.



2. DCI flush bolts and coordinators.



3. DCI bumpers and stops.



4. DCI electromagnetic locks.

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5. The rotating latch.



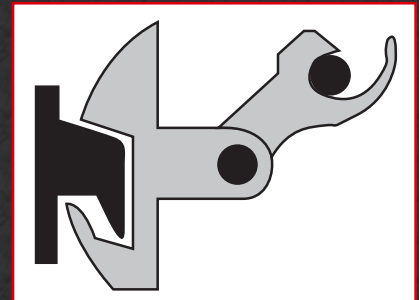
9. Loosening the Allen screws on each housing.



6. A chronic maintenance and security problem was this narrow stile storefront door.



10. The rod actuator or slide.



A. The PANNEX rotating latch.

engage the strike and forms an interlocking grip. If an attempt is made to force this unique strike from the outside, the "grip" of the device becomes stronger and more difficult to break. *Illustration A*, is the company's rendition of the rotating latch.

This unique interlock provides more security than a standard 1" deadbolt would.

The business end of the PANNEX device. (See photograph 5.) The arrow points to the rotating latch.

St. James, a new educational facility had a chronic maintenance and security problem with a narrow stile storefront door. (See photograph 6.) The door was equipped with a concealed vertical rod device, that for whatever reason would simply not stay in adjustment. (See photograph 7.) Since this area of the building was a child daycare facility, a malfunctioning exit device and the security breach was unacceptable.

I suggested I install the PANNEX 1210 on that door, which would accomplish two things: The maintenance problems would stop and the security aspects would improve tremendously.

The first step was to disconnect the closer arm. (See photograph 8.) For those of you who have never



7. A concealed vertical rod device.



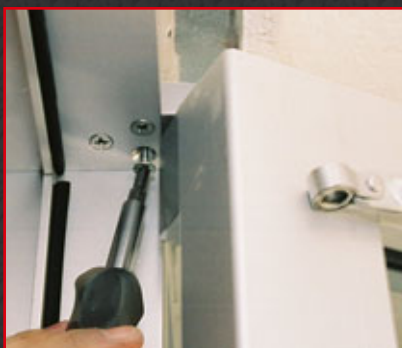
8. Disconnect the closer arm.



11. The cam and mounting studs.



12. The clip being removed.



13. Remove the screws holding the pivot cap in.



14. The cap fits in the receiver slot cut in the header.

worked on, or removed a concealed rod exit device from a narrow-stile aluminum door, don't be intimidated by the prospect. With the door in the open position, the push bar and housing is removed by loosening the three Allen screws on each housing. (See photograph 9.)

With the bar and housing out of the way and the door still on the pivots, you can see the rod actuator or slide. (See photograph 10.) The actuator controls the vertical rods.

The next step is to remove the actuator cam and the mounting studs. The top arrow points to the cam and the lower arrow points to

one of the mounting studs. (See photograph 11.) It is these studs that the housings mount to.

The top and bottom rods are held in place by a washer with a clip on it. A close-up of that area shows the clip being removed. (See photograph 12.) Simply remove the clip, pull off the washer and the rods are free to be removed once the top and bottom retaining screws are removed. The top rod can be removed with the door on its hinges. The bottom rod cannot be removed unless the door is taken down.

My son Kelly is removing the first of three screws holding the pivot cap

in. (See photograph 13.) The pivot cap has been lifted free of the frame. (See photograph 14) The arrow points to a slot in the cap that fits over the edge of the receiver slot cut in the header of the frame. That groove will help hold the door in place until you are ready to remove it by pushing up on the cap slightly and allowing the door to tilt outwards. Just lift the door off the bottom pivot and place it where you wish to remove the bottom rod.

Here the top rod retaining screws are being removed. (See photograph 15.) The rod is then pulled free of the door. (See Photograph 16.) The bottom retaining screws are then

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15. Top rod retaining screws being removed.



16. The rod is then pulled free.



17. The bottom retaining screws being removed.

removed prior to removing the bottom rod. (See photograph 17.)

Remounting the door on the pivots is easy. Simply place the door on the bottom pivot, put the pivot cap in place and guide the cap into the slot in the frame header and replace the mounting screws.

NOTE: You can take down and work on one of these doors by yourself. I've done dozens of them. However, believe me when I say it is much easier if there are two people. Especially on windy days!

Okay, now we're finally ready to mount DCI's 1210 device. If this installation had been on a wood door or a hollow metal door, it would have been over in under thirty minutes. If it had been mounted on a new narrow stile door, it would have been a simple, straightforward installation. Mounting it to replace a vertical rod device as we did, involved much more work and necessitated a few extra preparation procedures that would not normally be necessary.



18. The cover plate on the latch side of the door.

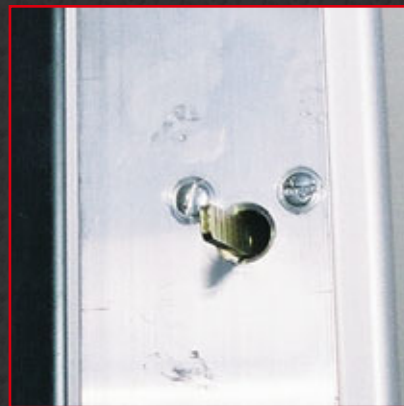


19. The cover plate is covering the cylinder prep.

If you look back at photograph 13, it will be quite obvious that once the vertical rods, actuators and studs have been removed, there will be a number of unsightly holes in the stile of the door. The PANNEX 1210 did not cover all the holes. Consequently I used two pieces of aluminum flat stock (2"x18"x7") to cover the holes in both the latch stile and the hinge stile.

This is the cover plate on the latch side of the door. (See photograph 18.)

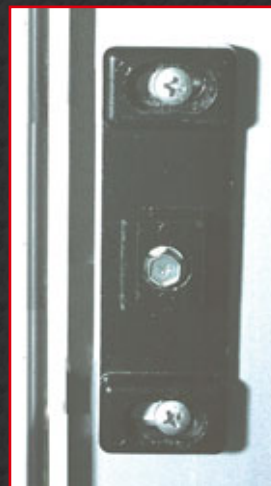
If you look at photograph 19, you will see that the cover plate is covering the cylinder prep. (You're looking through the cylinder prep from the outside of the door here.) This however, is not a problem. From the outside of the door, we drilled the necessary holes and then countersunk the mounting screw holes on the inside, then enlarged the hole the tailpiece protrudes through. Here you can see the cylinder is mounted to the stile. (See photograph 20.)



20. The cylinder mounted to the stile.



21. Drill pilot holes for the PANNEX strike.



22. The strike installed.

Here again, I have to interject a note of explanation. The PANNEX device is designed to have the cylinder in the 9/3 o'clock position. In this instance you will note that the mounting screws holding the cylinder are in the normal 6/12 o'clock position. What happened was this: When we were ready to install the 1210, it became apparent that the cylinder hole was "off center" for a mounting according to the directions from DCI. In order to utilize the existing prep without using an exterior plate of any sort, we simply used a rim cylinder with a universal tailpiece configuration.

The only modification we had to make to accommodate that cylinder was to slightly enlarge the hole where the tailpiece exited the stile to keep the tailpiece from rubbing against the edge of the opening. Otherwise the unit was mounted to specifications and worked very, very well.

Kelly is drilling the pilot holes for the special strike utilized with the PANNEX. (See *photograph 21.*) The



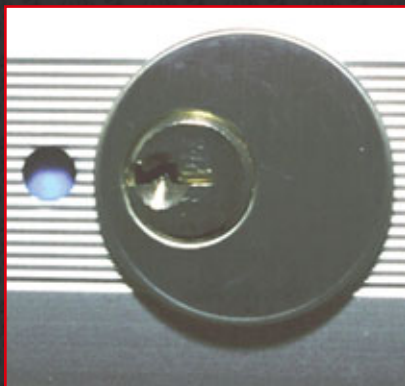
23. The device attached to the stile.



24. The completed installation.



25. The latch and strike.



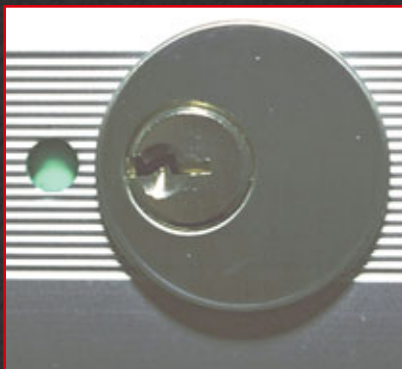
26. The blue dot indicates that the face and end cap can be removed.

strike is then installed on the frame. (See *photograph 22.*) Next, the device is attached to the stile of the door. (See *photograph 23.*) Here we used self-drilling screws for the initial mounting and then drilled all necessary holes and used the through bolts provided by DCI in the hardware mounting package.

The PANNEX is installed and the installation is complete. (See *photograph 24.*) After seeing the interlocking feature of the 1210 latch and strike, I'm inclined to agree with DCI's assessment that this is one tough cookie to crack by force. This is a close-up of the latch and strike. (See *photograph 25.*)

Notice in *photograph 26*, the blue dot beside the key operated alarm module. The blue dot indicates that the face and end cap of the device can be slid out the hinge side end to change batteries or do other service work. When the blue dot is NOT showing, then the face is locked into place and the device is operational either in the alarmed mode or unarmed mode.

Photograph 27, shows a green dot beside the alarm's key cylinder. This



27. A green dot indicates that the device is not in the alarmed mode.



28. The red dot indicates that if the bar is pushed the alarm will sound.

indicates that the device is not in the alarmed mode and will allow free egress without setting off the alarm.

Photograph 28, has a red dot beside the key cylinder. That red dot indicates that if the bar is pushed the alarm will sound. The alarm is loud and attention getting.

So what do I think of DCI's PANNEX 1210? I think it's a nice, heavy-duty, installer-friendly piece of alarmed panic hardware. Depending on the bells and whistles you select for it, the retail price is around \$250.00 to about \$500.00. Your cost would depend on your distributor discounts and other factors like freight.

From what I could see of its construction and operation on this one door, I think it will stand up well to heavy traffic. It is Grade 1 rated (ANSI/BMHA 15.36-1994) and is ADA compliant. Overall, I believe it's a device that you would do well to take a look at.

For more information contact Door Controls International, 2362 Bishop Circle East, Dexter, MI 48130. Phone: 1-800-742-3634; Fax: 800-742-0410; Web: <http://www.doorcontrols.com>. Circle 393 on Rapid Reply. **TNL**

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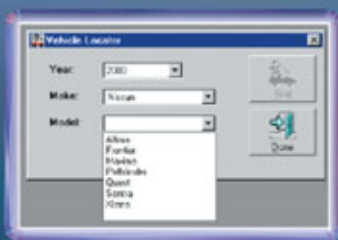
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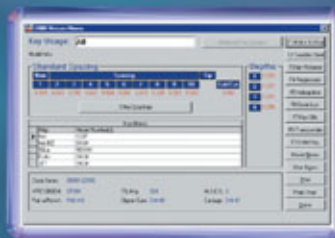
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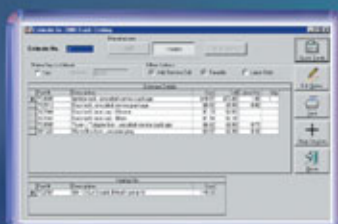
Choose the car

STEP
2



See all data
including spaces/
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parts, code locations
and more.

STEP
3



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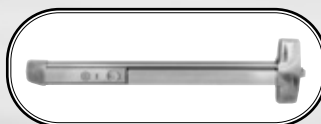
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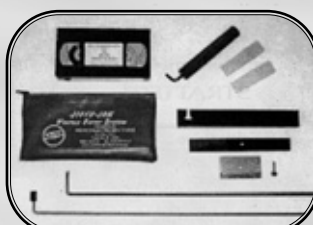
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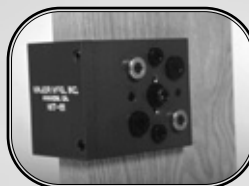
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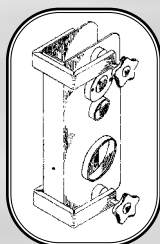
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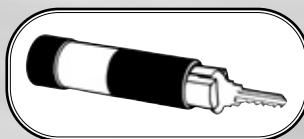
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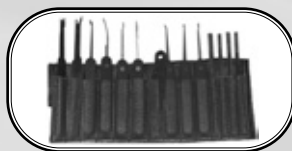
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The National Locksmith
1533 Burgundy Parkway
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**Tips Start
on Next Page**



**JET KEY BLANKS
WINNER:**

**Originating a
TriMark Trailer
Lock Key**

The new TriMark trailer locks have a deadbolt lock and a locking lever handle set. One key fits both locks. I have found that the deadbolt lock is the easiest lock to use to make a first key, since the lever handle cylinder is riveted in place.

**Deadbolt picks
counter-clockwise.**



**Cylinder in lever handle
is riveted in and not
designed to be removed.**

Make sure cam is upright.



**Last wafer in lever handle
is riveted in and **not**
designed to be removed.**

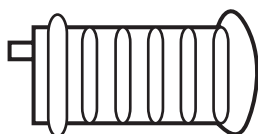


Illustration A.

Illustration A, shows that the cylinder in the deadbolt picks to the right one-half turn. The reason you have to pick the plug to the right is so the retaining wafer, which protrudes from each side of the plug, can fall into a slot that allows the plug's removal.

Insert a pick like a diamond under the sixth wafer and move the retaining wafer to the left to release the plug from the cylinder. Once you have the plug in hand, the rest is relatively simple.

A Few Words From Jake...

More and more locksmiths are asking me about "*Total Door Service*." That is, going beyond the locks to closers, operators, panic hardware and even into complete door rehab; including hinge maintenance and replacement.

One of the things I'm most frequently asked is where they can get information about doors, and door repair, etc. Since I hate to miss an opportunity to beat my favorite drum, I'm pleased to say that there are several great sources where you, the locksmith can get more information on doors, hinges, and other neat stuff than you ever thought possible. I'm giving you two of them here.

One is *The Door Hardware Institute (DHI)*. DHI is an association based in Chantilly, Virginia that probably has more good, reliable information available on doors and such than any other organization that I'm aware of. The great thing about DHI is that you do not have to be a member (although, it would be encouraged) to have access to their library of technical bulletins and other printed matter. True, you will pay a slightly higher price for it than members, but it's worth the price.

You can contact DHI by writing: DHI, 4150 Newbrook Dr., Suite 100, Chantilly, VA 20151-2232. Phone: 703-222-2010; Web: dhi.org. There you can get information on their tech school schedules, courses and books. DHI can be a really great resource for you.

Another fantastic resource is *Markar Products*.

Markar is offering free classes on product installation around the country. The program is called Facts To Go is free to anyone wishing to attend. Markar has also scheduled a number of classes at the various trade shows and at their headquarters in Lancaster, NY.

Here's their schedule from April, through the end of the year:

April 5-7	F.A.C.T.S. @ Markar	Lancaster, NY
April 9-11	CSI Show / Booth #764	Chicago, IL
April 14-16	BHMA	Tucson, AZ
April 29-May 3	SHDA Conference	Ponte Vedra Beach, FL
May 15	F.A.C.T.S. to Go	Phoenix, AZ
June 12	F.A.C.T.S. To Go	Portland, OR
June 26	F.A.C.T.S. To Go	Concord, N.H.
July 14-16	ASHE Show/Booth #	San Antonio, TX
July 18-20	ALOA Show/Booth # 923	Las Vegas, NV
August 22-25	Rep Training/F.A.C.T.S. @	Markar Lancaster, NY
September 5-7	DHI Show/Booth # 1023	Tampa, FL
September 8-10	BHMA	Bonita Springs, FL
September 12-13	Spec Forum	Niagara-on-the-Lake
September 25	F.A.C.T.S. To Go	Minneapolis, MN
October 16	F.A.C.T.S. To Go	Tulsa, OK

For more information on these free events call Markar at: 1-800-866-1688.

I want to stress that I think these classes are a must for any locksmith or door service person that wants to expand their horizons, and put more shekels in their pocket.

See y'all next month...



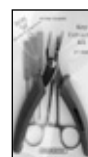
**by Jake
Jakubowski**

This is a double-sided plug with a double-sided key and both sides of the key have the same depths.

As can be seen in the illustration, when inserting the plug, make sure that the cam in the lock is pointing up so it can engage the plug.

Then simply reassemble the lock and you're in business.

*G. R. Lazich
Wisconsin*



**WEDGE CO KEY
EXTRACTOR WINNER:
Key Pouch and Harley
Tip**

I offer my customers something that they have just about gone nuts over. I take two of my business cards, place them back to back, then laminate them together in such a was as to form a pouch. Then I punch a hole in the end and put a give away key ring in the hole.

Whenever I decode a key to a customer's vehicle, I put the paper with the code information on it into the pouch, put the ring on it, and put the new keys on the ring. Then I give the pouch to my customer and tell them that if they should lose their keys, the information in the pouch will enable me to make keys faster and easier and will save them money.

On another note, in the last issue I received of *The National Locksmith*, I noticed a Technitip where a customer was using 137B keys to make Harley Davidson motorcycle keys. When I use these key blanks, I usually have to file the nub protrusion a bit to make the key work smoothly. (See illustration B.)

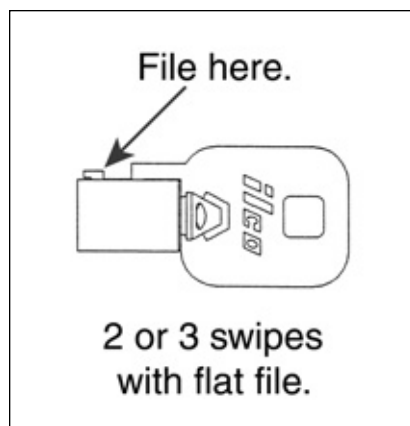


Illustration B.

Also, I would like to stress caution in trying to "read" the after market locks for the Harley's. I have found Harley's with the double-sided ignition lock have an electrical contact in the bottom of the keyway. If your reader is too long, it will make contact and either melt your reader tip completely off or burr a couple of the wafers in the lock from the current running through the reader.

*William Earl Knuckles
Kentucky*



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have discovered a method to easily make the first key to an American padlock.

What allows this method to work is the fact that every bottom pin excluding the #1 and #2 pins (occasionally you find them with notches, but that is a good thing) has the pick resistant serrations at the top of the pin.

Since these serrations are always at the top and there are always two notches per pin, with a little practice you can learn to judge the distance from the bottom notch to where the pin starts to taper at the tip. By this method you can effectively determine what the size of that particular pin is.

The number one pin is easy to determine, and I found that it helps to place pins of different lengths beside the keyway to compare them with the pin you're trying to read. Do that for each chamber and you can easily determine the length of each pin in the lock.

Once you have decoded the first pin, use a pick to push the first pin all the way up into the chamber and hold it there by applying torque on the turning tool. This will enable you can get a good look at the second pin for determination.

Once you've determined the second pin, push both the #1 and #2 pins all the way up and hold them there so you can determine the 3rd. Repeat this process for all the pins, using a flash light to assist you.

I've found that the 5th pin is pretty hard to see, so if you're confident on the first 4 pins you can progress the cuts in the 5th space. One thing you must remember is that if there are #1 and #2 pins in the lock without notches, they may fool you. A #1 pin will very closely resemble the distance from the bottom notch to the beginning of the taper on a #4 pin. As well a #2 pin will closely resemble the distance on a #5pin.

With a sharp eye one can tell the difference between a shear line and a notch. Using this method I have made existing first keys to many padlocks.

*Clifford Plummer
Canada*

Editor's Note: Clifford, I can see how this would work and would like to try it the next time I have an American Padlock

that needs to be decoded. The only fly in the ointment that I can see is if the lock was previously rekeyed and the person doing the work did not use original American pins. One of the fastest ways to do the American padlocks, in my opinion, is to drill out the retainer, drop the cylinder and either shim pick it, or replace it with another. Thanks for sending this in.



HPC WINNER: Opening Schlage F-Series Locks

Here's how I open a Schlage F-Series key-in-knob lock, or lever set in just a matter of seconds—without a key!

First, I grasp the knob and apply light and continuous turning pressure (in either direction). Next, I use a small hammer and sharply strike the face of the plug, making sure not to hit the knob or lever and risk denting it.

You will be amazed at how quickly this opens one of these locks. After a few times and once you develop a feel for the procedure, you can open F series locks in a matter of seconds.

The reason this procedure works is that the locking mechanism is spring loaded, and by striking the face of the plug, you are actually bouncing the two locking cams into the open position for a split second. That is why you need to engage the knob with light and continuous clockwise or counter-clockwise pressure to unlock it.

This method does work on the "F" series lever, however I found it takes a lighter turning force and a sharper hammer blow.

*Mark Anthony Novitsky
Virginia*

Editor's Note: Mark, I would suggest using an uncut SC-1 blank, inserted in the plug and hitting the bow of the blank with the hammer. It's a better target and there's less chance of doing damage to the face of the knob or lever. Also, bump keys work very well on F series locks. Either method can be quick and effective. Thanks for sharing your idea with us.



SARGENT AND GREENLEAF WINNER: Zip Tie Clip Trick

Have you ever dropped a plastic linkage clip into the bottom of a door

panel when removing or servicing a vehicle door lock?

How about a late-night call? It's cold, and a clip gets broken and of course, there isn't one like it anywhere in your service truck, right? If this has happened to you, try a simple, effective solution that only taps your spare change, not your wallet.

An electrical wire tie (zip strip) will hold forever once properly applied. It's quick, very easy and only cost a couple of pennies. Simply secure the linkage rod as usual and then tie it where the clip is broken, usually around the part that snaps the rod to the clip. If the clip is lost or broken, it will take two ties linked together at a 90-degree angle.

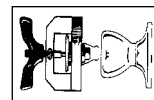
I've used them to secure spare keys for autos, just thread the key, find a likely spot and zip. No magnets to let go or bounce off on a rough patch of roadway.

I have even used them to secure my chuck key to the cord on my drill. Just secure one to the drill chuck and one to the cord and one more to loop between them, and you will not only never loose your chuck key again, but it will also stay secured to the cord without moving.

Last week, I even secured the security sensor on a Mercedes driver's door lock cylinder using a zip strip. I had to file a groove in the bottom of the housing so it wouldn't slide off, but it did an admirable job. Because the security system had engaged, the alarm was going off and the owner couldn't start the car. The owner saved not only the tow bill, but also cab fare, rental car expense and a costly dealer repair bill.

I carry an assortment of sizes. Check them out, you'll have no trouble finding a wide variety of uses.

*Roy Freiburger
Nevada*



A-1 SECURITY PRODUCTS WINNER: Master Pro Series Tip

I'm an institutional locksmith at a southern Ohio prison. We use several Master Weather Tough Pro-Series padlocks in the facility. After continuous use, the cones of the shroud on top of the lock become loose around the

Continued on page 86



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shackle. This allows water into the locks, causing damage when the locks freeze in the winter. My partner, Aaron McCord came up with a solution. We put rubber $\frac{1}{2}$ " OD x $\frac{1}{4}$ " ID "O" rings in both cones of the shroud and seat them against the lock body. This creates a long lasting watertight seal. Add a little grease for lubrication and your all set.

Paul W. Hawk
Ohio



ILCO KEYBLANKS
WINNER:
**Telephone Lock
Opening Trick**

In my area, there seems to be a lot of privately owned pay phones that belong to companies that have gone bankrupt and have abandoned the phones. Many of these phones have ABLOY locks on them and they have to be opened to remove them or make keys for.

The easiest way I have found is to use a Dremel tool with heavy-duty cut off wheels to cut the face of the lock. Cut two slots ($\frac{5}{8}$ " to $\frac{9}{16}$ ") up from the "B" in ABLOY.

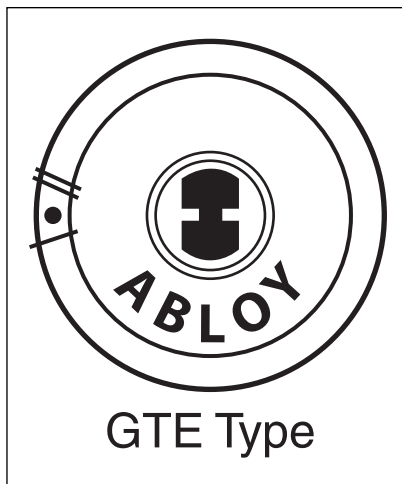


Illustration C.

Make the cuts as shown in *illustration C*. Then use a punch to knock out the piece cut.

Once the piece is removed, it will expose a small diameter pin. Remove this pin and you can rotate the lock to open.

Then all you have to do is replace the lock.

Dan Stacey
New York



KEEDEKX WINNER:
Master Padlock Trick

We had a customer who needed two #25 Master padlocks keyed to the 1K blank. The only problem was that we had just used our last blank the day before and our stock replacements hadn't arrived yet.

So here's what I did. I ground off the bottom rivets of a #3 padlock (discarded because of broken shackle) and removed the cylinder. It is pretty much just like the ones used in the re-keyables, but has two crimps, as retainers, instead of one. After shimming it to turn, I rekeyed it through the drill holes in the bottom of the cylinder.

With the regular plug extension it worked just fine. I made sure to get a few extra 1K cylinders in the next week.

James Barthelemy
Tennessee

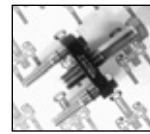


TECH TRAIN
TRAINING VIDEO
WINNER:
Drilling Jig Tip

Whenever I drill a hole for a deadbolt using a Kwikset-type installation jig, I place a strip of "duct" tape over both inside surfaces of the jig. This has three advantages:

1. It protects the finish on the door.
2. It helps to stabilize the jig and keep it from moving.
3. It helps to collect metal shavings on the insulated steel doors so commonly used today.

Frank Smode
Oregon



SIEVEKING
PRODUCTS GM E-Z
WHEEL PULLER
WINNER:
Transport Tip

A 1994 Transport van tailgate lock we had to work on would operate with the electric switch, but not with the key. I simply replaced the corroded tailgate lock with a new Strattec lock #701928. Then I found that the electric switch would no longer operate. I had to remove the panel once more to find the problem.

This can be a very difficult problem to diagnose, because when the linkage is connected the problem is hidden.

This lock comes with the traditional plug and housing, but there is also a sleeve that slips into the housing. A serrated pin is included to press into a hole to bond the housing and sleeve.

The pin is to be used for mechanical operation only. If the lock operates electrically, throw that pin away. The electric component has a small arm that protrudes outward to slip into this hole. If the pin is installed it blocks this arm and prevents electric operation.

Live and learn, right? Thought I'd pass this on.

Mike Spencer
Canada



MAJOR
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PRODUCTS
WINNER:

Corbin I/C Removal

Some time ago Tom Lynch sent me a bunch of Corbin IC's without keys and still in the mortise cylinder housing. I tried picking them for removal and reuse, but no luck, as I was unable to put pressure on the control sleeve.

I ran across a tip in an old magazine in which the locksmith stated that he used a shim cut from an old soda can to apply pressure to the control lug. He picked pins 2-5 first and then picked 1 and 6 to remove the I/C from

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OID-4/02

the housing. I was not successful with this method as the shim material kept tearing under pressure.

I decided to drill a $\frac{3}{32}$ hole through the lock housing just under the control lug and apply pressure to the control lug with a probe. I was able to pick pins 2-5 which allowed rotation of the control sleeve and remove the IC from the housing. I decided to combine this technique with the bump-key technique and was very successful in removing the cores from the housings. In fact several of the cores appear to have the L1011-LXX keyway and I did not have any blanks in stock. I instead used a Yale 999A (Y2) cut to all 6's and bumped the cores to the control shear. Remember: only pins 2-5 have to be picked for the Corbin core removal.

I used a drill point $\frac{7}{16}$ from the front of the housing and down approximately $\frac{3}{32}$ " from the centerline of the core.

Note: The housing is very thin at the drill point, so use minimal pressure to not damage the control sleeve. You will feel the drill break through the housing.

This technique allows for reuse of both the core and the housing.

Since then, I've been playing with some more I/C's. The tip also works for Best I/C's in the thicker housings. The major difference is you cannot feel the bit break through like you do on the thinner Corbin housings.

This tip should work when trying to remove most I/C cores from the various housings. I picked the Best cores as I didn't have a blank handy that would enter the keyway. I actually like this method better than using the Finch wrench.

Bob Strohecker
Missouri



**LAGARD WINNER:
Eviction or
Foreclosed
Properties Tip**

When called to rekey a foreclosure or eviction, you never know what you're going to run into and sometimes the odors can not only be overpowering, they can be downright sickening.

I learned this tip from the Deputy Sheriff when I was called to rekey a home where the owner had vacated the premises a day or two prior to us taking the action required by the bank.

When I opened the door the stench almost knocked us out. While I was in the van rekeying the locks, the deputy brought over a small jar of Vaseline and told me to place some on my upper lip. When in the house he said just breathe through my nose and I would no longer smell the odor in the home.

This does not excuse anyone's nasty living conditions, but will help you to get through without getting sick, and possibly even vomiting. I have also developed the habit of using a hand-sanitizing agent after leaving most jobs and rub it on the steering

wheel and door handles as well. You can't be too careful out there. If you are out of work because of a sickness like the flu, you can't pay the bills.

Besides the Vaseline also comes in handy for holding those little short tailpieces in place when trying to align a Schlage deadbolt. Simply put a little under the retainer, insert the tailpiece and put it back on the door! The Vaseline is harmless to the lock and that little trick can save you a lot of time.

Wayne Gow
North Carolina

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Beginner's Corner



In The Tool Box, Part 3

By Ken Holmlund

In this article I will continue to cover some of the tools I believe to be essential for every shop. I again want to stress that I am not comparing different brands of tools, just giving my opinion on the tools I use on a daily basis.

—Pick Tools—

Probably one of the most personal of choices in locksmith tools involves picks. There are a vast number of manufacturers producing picks of all sizes and configurations. Some are thick and some are thin, some have rubber handles and some use the body of the pick as the handle. Some are stiff and some are flexible. Some are computer generated and some come from actual use in the field. The choices go on and on, but I would bet that most locksmiths



1. Assorted Picks

settle on one style of pick and pretty much stay with that pick.

Although I do have many types of picks, my pick of preference is the HPC HLPX-11. (See photograph 1.) You may prefer something else and I suggest trying several configurations of tips by various manufacturers until you find the one that suits your method of picking best.

One comment about picking locks: It is an acquired skill and one that takes a lot of practice and patience to perfect. If you plan on

picking locks, take the time and put in the work to get good at it. I have found it to be one of the most difficult skills of locksmith work and one that requires constant practice. It is a skill you will need, but it will not come easily.

Some people prefer grips on their picks because they do not like the feel of spring steel their hand, or the increased size of the handle fits their hand better. I prefer the handle to not be covered because I like the direct connection to the pins I can get from the solid handle. I have tried picks that do not have any additional handle than just the continuation of the pick itself, and I found them to be very uncomfortable. Everyone has their preference, that's why there are so many options available.

—Pick Guns—

Several manufacturers have on the market a picking gun that is claimed to be the answer to all picking problems. (See photograph 2.) My experience says otherwise. I have the gun, but have not been as successful with it as I have with the hand held picks. Others swear by it. I know the gun will do what it is advertised to do, and it's just a question of practice and preference. I do suggest you learn



2. Pick Gun

hand picking methods first in any case.

—Turning Tools—

Along with picks comes the tension wrench, turning wrench, tension tool, turning tool. It seems like everyone has a different name for this tool, but suffice it to say, they are necessary. We have all seen the shows on TV where a crook or someone else walks up to the door and picks the lock with just a hairpin and nothing to turn the lock. The truth is, they have a better scriptwriter than we do in the real world and we must have something to convert the torque necessary to open the lock.



3. Turning Tools

Turning tools come in many different tensions and configurations as well. I have experimented with several of them, and have found the rigid HPC TR-4 wrench to be my favorite. (See photograph 3.) However, there are several other manufacturers that make fine turning tools as well, and again, you may prefer something else. Never use someone else's recommendation until you have tried it yourself, especially with tools. There are several manufacturers and options for similar tools for a reason—everyone has their own preference.

Continued on page 90

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I do cut a little off the end of the wrench for me to have better control of the tool in the lock, but I keep one long tool for use in Weiser and other locks that have a recessed face. A longer tool is needed to pick some auto locks as well. I chose the rigid tool because I feel I can put less pressure on the cylinder and get a better feel of what's going on inside the lock. I like to be able to feel the pins hit the sheer line and the rigid tool gives me that feel. I found I put too much pressure on the cylinder when I used a lesser tension tool.

Yet another form of the turning tool that comes in handy is the double-fingered tool. They work well for locks like a double-sided Chicago or Illinois lock where you need to be able to pick both sides and keep equal turning pressure on both sides of the lock as you pull the pick tool out to move to the other side. On many vehicles you will be well served to use this kind of turning tool. Here again, I have found the more rigid tool to be to my liking for the same reasons I stated before.

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—Key Extractors—

You will often be called on to get broken keys out of locks. Here again there are several types of tools available. You may need all of them at sometime, because different locks will require different methods of extraction. (See photograph 4.)



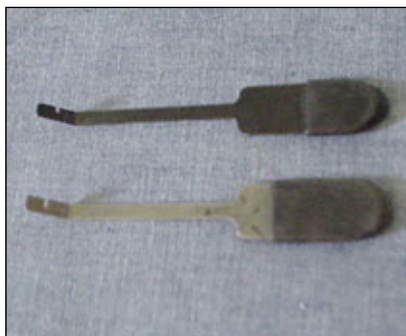
4. Extracting Tools

For broken keys that I can get a good grip on, I like the small stainless steel barb type, but for keys that are broken further down in the lock, the screw type is superior. Using two screw type extractors wrapped together is a very good way to get keys out that are broken deep into the lock, or where the key is behind a wafer that will not move otherwise. If you have a considerable amount of clearance, the saw type extractor works, but it is limited in its applications.

These tools can break, so caution should be applied when using them. I would suggest checking into Wedgeco or HPC who both make excellent key extractor tools and kits.

—Shutter Keeper—

Since I am talking about removing broken keys, I will include another useful tool. It is the HPC GTO Gateway tool. (See photograph 5.) This two-piece set is intended to do the troublesome job



5. Gateway Tools

of opening the dust gates on automotive door locks and it works very well. Sometimes it seems we need three hands to do everything necessary to get to the broken key, and the gateway tool gives us the proverbial third hand. It is not a necessary tool, but it sure is handy to have in your toolbox.

The tool examples given are used simply as a reference, and not necessarily as an endorsement. These are examples of tools I believe are necessary to have, not necessarily the best there is. Everyone's example of "best" or "favorite" is subject to individual interpretation. There are several manufacturers supplying similar tools of excellent quality, which I also use.

See you next month with more fascinating tools for the locksmiths toolbox.

*For information on
the tools listed contact:*

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The Lighter Side

The Way I Heard It



by Sara Probasco

Have you noticed a lot of locksmith or security-related tales have been circulating via the Internet, various publications, and word of mouth, lately? Labeled “urban legends” a decade or so ago, these sorts of tales were typically passed along by somebody who knew the guy who was there, or knew a friend of the person involved, or “had it on good authority” that it had actually happened, but, somehow, you could never quite manage to talk to the one it happened to.

One tale that was recently forwarded to me from a variety of sources is the “true story” about a feisty, elderly lady who went shopping and upon returning to the parking lot, saw four men getting into her vehicle. Enraged and apparently prepared to defend herself from anything, she dropped her shopping bags and yanked a handgun from her purse, shouting, “Get out of my car, you scum bags. I’ve got a gun, and I know how to use it.”

Need I say, the guys leaped from the car and hot-footed it across the parking lot!

After loading her groceries into the back seat, the lady climbed in behind the steering wheel and hand trembling from the excitement, tried to insert her key into the ignition. It wouldn’t go in. After repeated attempts, she finally got out and looked around for someone who might help her. There, three spaces away, sat her car, identical in color and model to the one the men had occupied.

Unsure what to do, she decided to go to the police station and explain what had happened. The sergeant in charge had a hard time keeping a straight face as she told her story. Then, laughing aloud, he pointed to four men huddled at the far end of the counter. It seems they had come in to report their car stolen by an insane woman described as white, less than five feet tall, with glasses, curly blue hair, and a very large handgun.

No charges were filed.

Mistaken identity of vehicles is more common than one might think. Another story was recently sent to me by a reader. A man traveling out of state on business parked his car in a mall parking lot while he went into a restaurant for dinner. After dinner, he returned to his car, opened the door, and got in. He remembered wondering why he hadn’t locked the door, as was his habit, but he shrugged it off and proceeded to insert his key into the ignition. It wouldn’t turn. He tried several times, with no luck. Glancing about, he noticed some souvenir baubles hanging from the rear-view mirror and other items scattered about the car that clearly weren’t his.

That’s when he noticed that parked directly in front of him was another car of the same make, model, and color. His car. Imagining what it would be like to try and explain his mistake to strangers in uniform at the local police station, he quickly eased himself out of that car and hurried to his own.

Several years ago, a friend told us that his brother had unlocked the door of a vehicle the same make, model, and color as his own, gotten in, turned on the ignition, and driven several blocks before noticing it wasn’t his car. The two identical vehicles had been parked side by side in a parking lot. The keys were also identical. Now, what are the chances of that happening?

“Urban legends” in locksmithing certainly aren’t confined to cases of mistaken vehicle identity. Remember the tale that circulated years ago, about a guy who had forced a key ring onto his private parts to enhance his “manhood,” and couldn’t get it off when the body-part started swelling? Every version I heard began with a call from the local hospital emergency room, asking the locksmith to bring a metal saw on the double. Once there, the locksmith refused to “operate,” due to the delicacy of the situation and his lack of appropriate malpractice insurance. However, he agreed to supervise the doctor, who eventually managed to free the relieved patient without incident. Surrounding this framework were varying details, depending upon who told it. The interesting point is, everybody who told me the story—from California to North Carolina and several points in between—said they personally knew the local locksmith whom they heard had taken such a call. One San Antonio woman even claimed it was her own locksmith husband who had experienced the event. However, I was never able to actually speak with the

locksmith, himself, about it. Again, the stuff of "urban legend."

True or not, such tales make for interesting conversation and reflection upon the what-ifs of our profession.

I'll give you another little incident to reflect upon. This one is true.

Last week, one of the guys who works for us called to Don in the back office.

"Hey, Don, can we order a set of lock picks for a customer?" He asked.

"Who is it?" Don said.

"I don't know. Some kid from up around Camp Wood."

"We don't order locksmith tools for anybody who's not a locksmith," Don replied.

Since four of the five people working at our store are over sixty years of age, anybody under forty (including the fifth one) is generally referred to as a kid, so when I heard the exchange, I naturally assumed that somebody on the younger side of forty had made the inquiry. Without looking up, I continued making my bookkeeping entries.

A little while later, Don came into my office.

"Did you hear all that a while ago, about the kid who wanted the lock picks?"

I admitted I had heard, but hadn't paid much attention.

"Said he was doing some lock-picking up at Camp Wood and had broken a couple of picks." Camp Wood is a very small town about twenty-five miles north of us.

"Oh, yeah? I didn't know there was anybody up that way doing lock work," I answered.

"I didn't, either." Don was quiet for a moment. Then he continued. "Said he'd learned how from information on the Internet."

"Is that right?"

"Yeah. That's where he'd bought his picks in the first place."

"I thought it was against Federal law to sell locksmith tools by mail-order," I said.

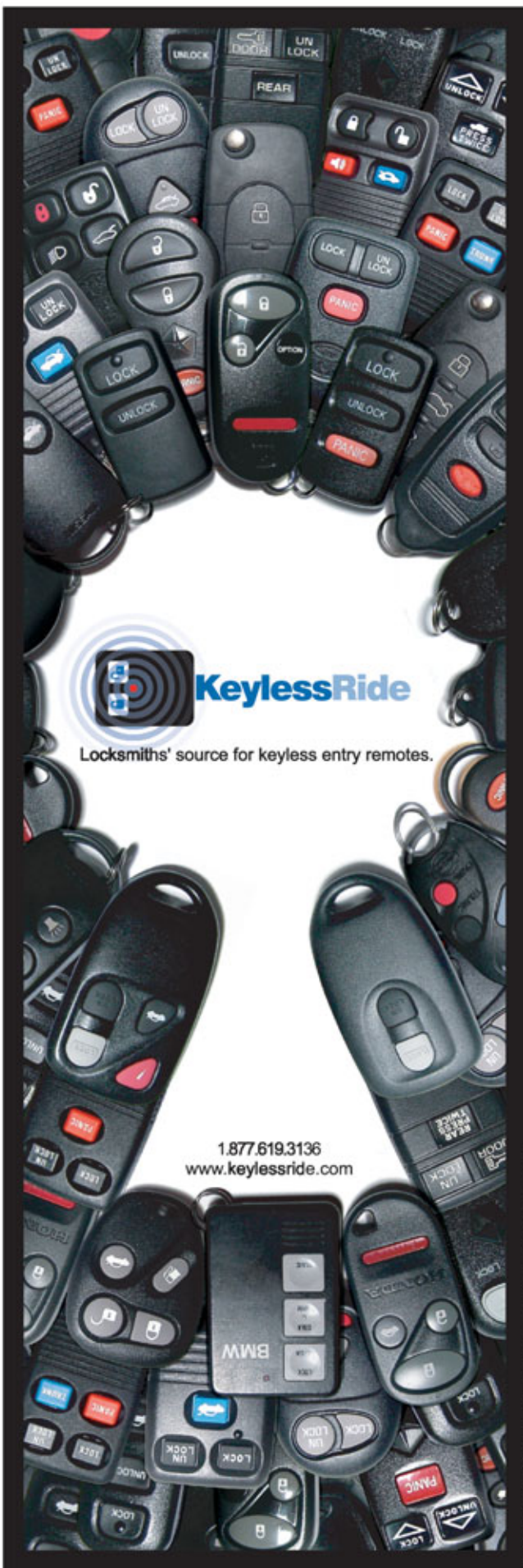
"It is. He said he guessed he could get another set from that source, but he'd rather buy them from around here, somewhere."

"What age person was he?" I asked, wondering if it was a young entrepreneur or a high school or college student.

"The guys said he looked to be about eight or nine years old," Don said.

This actually happened. I know our guy who was personally involved; at least I know it was one of two of the guys who were there at the time. At any rate, I have it "on good authority" that it happened that way. Of course, I didn't actually see the kid, and I didn't hear the conversation, myself. Come to think of it, Don was back in his office, so he didn't, either. Our guy who was working the front counter is the one who actually talked to the kid, although I've forgotten which one it was, so I've never quite managed to speak with the one it happened to...

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ELECTRONIC LOCKS & BORESCOPE HOLDERS



BY DALE W. LIBBY, CMS

When I first started opening safes I saw a lot of Yale OB locks and old Mosler and hefty Sargent & Greenleaf locks on all sorts of ancient safes. Those days of non-standard sized combination lock bodies and specially threaded dial spindles has mostly disappeared. Now mechanical locks have a standard footprint and are mostly interchangeable.

Now we have entered the electronic age of combination safe locks. They come in all sizes and shapes, from low tech to high tech and inexpensive to very expensive. Let us briefly discuss some of the good, and not so good points of these new-age amalgamations of electronic lock safe protectors.

On the low end, some of the less expensive locks are just glorified electronic switches that operate a solenoid, which is a plunger mechanism that blocks the movement of a part of the bolt bar mechanism. These locks come in all sizes and are open case locks consisting of a keyboard, connecting wires, and the solenoid mechanism. When the correct combination is entered, the solenoid pulls in the plunger and allows the bolts to pass over the magnetized solenoid and open the safe.

Next up the line come case enclosed locks with an actual combination lock bolt. Some of these locks are the swing bolt type where the bolt rotates out of the way of the bolt bar, and other locks have a traditional rectangular bolt that

moves into the lock. Some of these locks are fully automatic, and others require a dial or pad to be turned to retract the bolt.

Sargent & Greenleaf, LaGard, AMSEC and Kaba-Mas are some of the makers of the battery operated Group I type locks. These locks all require some type of battery to operate the keypad and possibly a bolt or internal solenoid.

The next generations of combination locks are made by Kaba-Mas. These locks create their own electricity by the spinning of the dial. They do this by powering up capacitors that power LCD lights or even digital displays.

This is just a very brief overview of locks that I have played with. I know there are other electronic locks, like those made in Canada and overseas, but I have not had much experience with them. This is just a broad-spectrum overview.

Electronic locks have several interesting features in common. The first and most prevalent is a keypad with numbers, letters, stars and pound signs. These are used for opening and programming some locks. This makes the electronic lock easy for customers to open. All that usually has to be done is to enter six or eight numbers and turn the handle to open the safe. Sometimes lights flash and beeps are heard to signify the numbers have been entered correctly.

With the Kaba-Mas lock one has to spin the dial or keypad dial to power up the lock, combination

entered and the dial must be turned to retract the combination lock bolt.

The safe technician cannot tweak an electronic lock like he can with a mechanical lock. There is no one-up or one-down dialing to open a stubborn lock where the dial ring has become loose and moved. If the electronic lock will not open, in many cases it must be drilled to defeated, and usually replaced. This is partially because the innards of the lock is proprietary and cannot be fixed.

One of the better features of most electronic locks is that they are manipulation proof. If a certain number of incorrect combinations are entered into the keypad, the lock will shut down for a period of time before additional combinations can be entered. This is a good feature for government work.

Another feature is the ease of changing combinations. Entering a special sequence of numbers on the keypad to re-program the lock does this. On the high end, not only can combinations be changed, and the number of users be changed, a time delay can be added or altered. In addition, Dallas key type chips can also be incorporated to further enhance the level of security.

Many locks also incorporate audit trails. This is an electronic trail of who opened the lock, when the lock was opened, for how long, etc. This list is endless. Let us get to the meat of this article (finally) and discuss one specific lock in brief detail along with changing the combination directions.

Continued on page 96

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1. Amsec wall safe with an old Mas-Hamilton now (Kaba-Mas) electronic lock installed.

Photograph 1, shows an Amsec wall safe with a retrofitted old Mas-Hamilton (now Kaba-Mas) round keypad Auditcon electronic safe lock. This is not the lock that came with the wall safe. The safe door bends in to accommodate a low profile S&G dial and ring so a picture or painting can be mounted over the stud mounted wall safe. With the Mas-Hamilton lock keypad it sticks out too far for this feature. It is now a wall-mounted closet safe.



2. Close up of the Mas-Hamilton lock on recessed wall safe door.

With a close up of the dial we see an atypical keypad with numbers 1-9 and the clear and enter buttons at the bottom. (See photograph 2.) The enter key is used when changing the combination. The other feature of this lock that cannot be seen is an outside ring that turns to power up the lock's internal capacitors. This ring is turned briskly until the red and green diodes located above the number 1 and 2 respectfully flash on to indicate that the lock is powered and ready to accept number input.

This model of Auditcon is a number 50, which is the lowest basic model and only requires a six number combination. To open this lock, turn the outside ring several times until the diodes flash. Return the ring to cover the red highlight at the top of the lock. Now enter the factory set combination of 50-25-50, waiting for a beep and flash after each entry. If the combination was done correctly, the green diode will flash and you can turn the outside ring

to the right to retract the lock bolt. If the combination was changed or the lock is broken, then turning the ring to the right will accomplish nothing.

Looking at the safe door and the positioning of the keypad, we can guess that the lock is mounted VU (Vertical Up) and that the combination lock bolt keeps the door locked. A simple, but effective configuration. There is no handle or other mechanism on this basic wall safe. Photograph 3, shows the inside of the door and the lock in fact mounted VU. This lock fits the standard footprint of modern locks.



3. Internal view of Mas-Hamilton Group I lock mounted VU.

To change the combination on this lock, just power up the lock, push "Enter" and then number 1. The lock beeps and flashes the diodes. Enter the existing combination 50-25-50 and the dial beeps and flashes again. Then enter the new combination twice, with beeping at the end of both entries. That is all there is to change the combination. There is more programming possible, but I just want to change the combination for now.



4. Large and small magnets. Masking tape on lower magnet to protect finish.

Simple borescope holders can be made from wide horseshoe magnets. Photograph 4, shows two of my magnets. The bottom magnet is my favorite. I do not remember where it came from, but I had it for years before

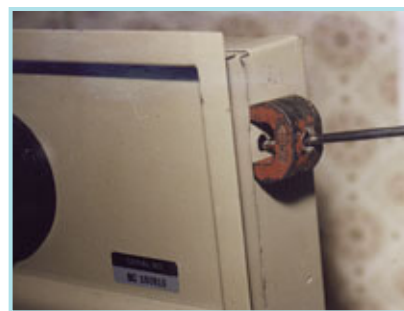
it became a simple borescope holder. The upper magnet was purchased at a hardware store. The lower magnet has masking tape on it to keep from marring the finish of Gun Safes and does not decrease the holding power of the magnet significantly.

The hardest part of making the holder is drilling a 1/4" hole in the magnet. It is very tough and hard to drill through. A regular drill bit will not do it. I used a couple of StrongArm drill bits and a drill press before I completed the hole.



5. Large magnet holding Super Scope easily in hole.

Photograph 5, shows the magnets on the side of the wall safe. I am using a Lockmasters Super Scope here. (See photograph 6.) The wall safe was the easiest to show this on and tie the article together. Both the large and the small magnets support the scope. I use the larger magnet most of the time. If I need the extra length of the scope, then I will use the small magnet.



6. Small magnet used when length of scope is important.

I must point out for the purist that one would never use a scope on a Mas Hamilton lock. There is nothing really to see. This is just for instructional purposes of holding scopes to sides of safes.

In my scope kit I carry Q-tips to clean my lenses as well as liquid lens cleaner. If I have to brace the scope in a specific position, I break off the cotton top of the wipe and use the soft stem of the Q-tip to delicately wedge the scope in the side of the safe or in the hole in the magnet. A simple, effective and non-damaging holder.

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AABLE's New Patented Chrysler Ignition Removal



by Frank Markisello

Even before Frank Markisello from AABLE Lock got his new Ford U1 flush mounted ignition removal kit into high gear, he was already thinking about how to improve it. Well, it didn't take long because Frank has already developed an update to the kit which is now on the production line. Besides picking many of the new Ford sidebar ignition locks, the U1 can now pick virtually all Chrysler, Jeep, and Dodge, 8-cut ignitions in less than 5-minutes with no damage to the lock. Just replace the facecap on the same lock and your back in business.

Similar kits just for Chrysler sell for over \$100.00. Frank will be including this in his U1 kit free, for an introductory period. He will also have different options for those who want just the Chrysler tool in a kit by itself, or the adaptor by itself. Best of all it is an affordable price and as always, made with top quality steel and craftsmanship.

Frank thought the best test is to show and tell, and where would be better than at a Chrysler dealer. Frank and his wife Liz brought their case of tools to the biggest Chrysler, Dodge, and Jeep dealer in town and headed for the repair department. He was told that the time allotment shown in the dealer flat rate manual to remove and repair an ignition lock on a 2002 Concord is 2 hours. You can imagine the service managers

reaction when Frank told him he would be out in 15 minutes. *"They must have shut their repair shop down to see us in action,"* Frank said, *"About 10 guys were watching us."*

"The service technicians in the shop just stood there in awe,"
Frank said.

Frank had never done a Concord with his new U1, so he did run into a couple of odd snags. Before you can remove the ignition lock, a tilt wheel lever, a skim module, a plastic cap over the ignition housing must be removed first. Even still, in just over 10-minutes Frank had the old lock out and a new one in. *"The service technicians in the shop just stood there in awe,"* Frank said.

Everything comes off easy, but I suggest you be careful, as it is all made of plastic that can snap real easy and break.

Note: I found it easier to screw the bottom half of the shroud in first, using the two #t15 torx screws. Then the top half can be snapped into the bottom half easily. Now just screw the tilt wheel lever back on the left side of the post with the #30 torx screw.

A list of Ford products the U1 works on:

All Focus locks, T-Bird, Mark VIII, Explorer, Mountaineer, Continental, Escape, Mazda Tribute, Contour, Mystique, Lincoln LS, Aviator, and more.

A list of Chrysler products the U1 (with adaptor) works on:

Chrysler ignition type: 703719, 705096 coded: 300M, Cirrus, Concorde, PT Cruiser, Sebring, Town & Country, Voyager.

Dodge ignition type 703719 and 705096 coded: Caravan, Neon, Intrepid, Viper, Stratus,

Dodge truck ignition type 704650: Durango, Ram Pickup, Ram Van, Dakota Pickup.

Jeep ignition type 703719 and 705096 coded: Grand Cherokee, Liberty, Wrangler, and more.

For more information about the U1 and Chrysler adaptor kit call Frank or Liz at: AABLE Locksmiths, (718) 848-8000 or visit www.aablelocksmiths.com.



1. Frank hovering over his next victim, a 2002 Chrysler Concorde.



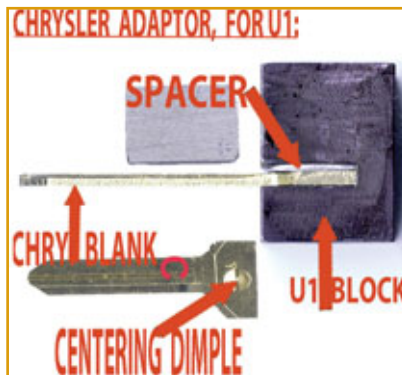
2. The difference between the two types of ignition locks mainly used. The #703719 being the most used.



3. The different tumblers used. Some have false cuts and the depth number is stamped on the wafer.



4. The Ford U1 kit.



5. The Chrysler adaptor for the U1.



6. Remove the tilt wheel lever. There is one #30 torx screw on the left side of column. This will allow the bottom shroud to drop down.



7. Remove two #15 torx screws from the bottom shroud, and drop the bottom shroud.

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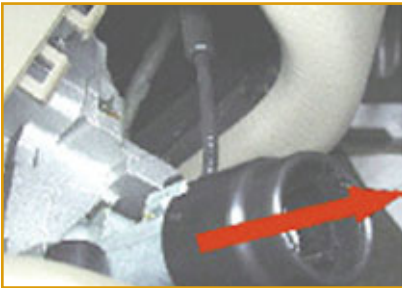
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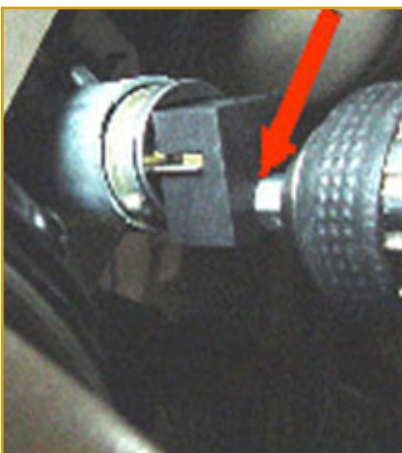
8. Remove one Phillips screw from the bottom of the ignition housing which holds the skim module, so you can gain access to the lock cylinder release hole. Be careful, you must lower it slightly so you can slide it forward allowing the black ring connected to it to be slid off the front of the ignition housing. It's only plastic, so take care not to break it.



9. Pull the black plastic cap off of the front of the ignition housing, it's held in place with two pressure tabs. Just wiggle and pull it off.

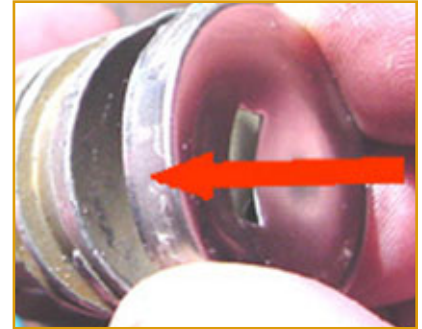
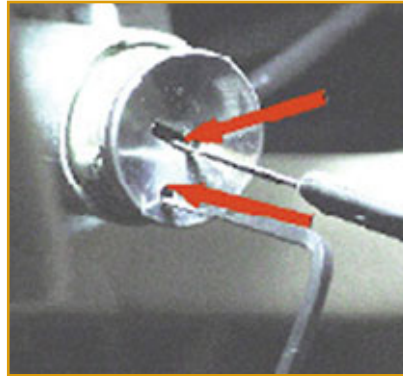


10. Insert drill block into the keyway.

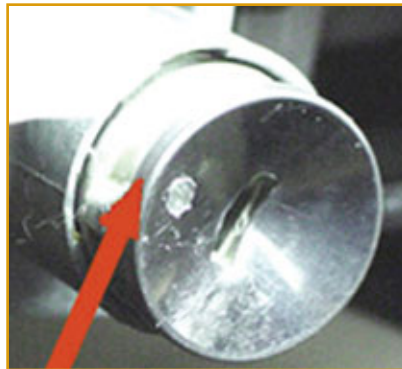


11. Using drill and arbor #3, drill into 1/8" guide hole until arbor hits the block.

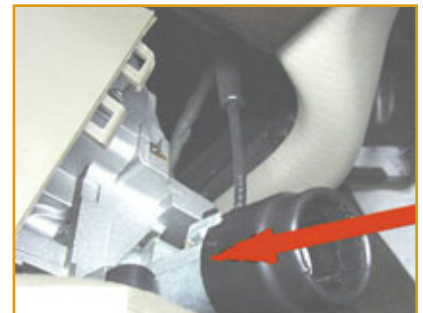
12. Insert sidebar pressure tool into the access hole you just made. Be sure it slides between the sidebar and the outer shell of the lock. Put slight inward pressure on it while you rake the tumblers from front to back. You will feel the sidebar tool drop in. At this point the plug is in the unlocked position.



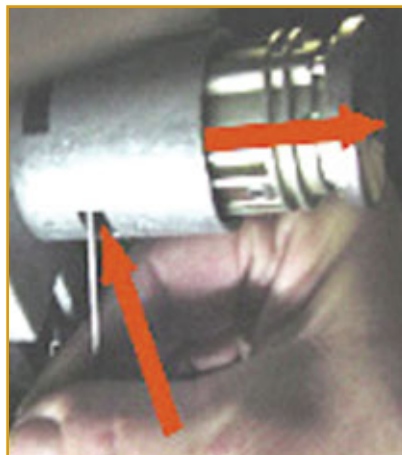
16. Insert the new cap #54, over the face of the plug and crimp it over the face ledge.



13. Put turning pressure on the face of the plug toward the "On" position. At the same time remove the sidebar tool so the plug doesn't relock.



17. Reinstall the black plastic cap over the front of the ignition housing.



14. Push the lock retainer in, and slide the lock out.



18. Reinstall the skim module and antenna ring.



15. To reuse the same lock, just pry the face cap off.



19. Reinstall the lock cylinder and the job is complete. 



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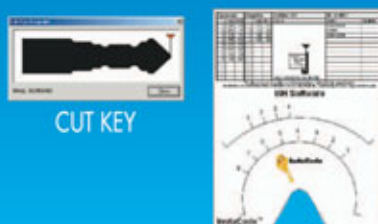
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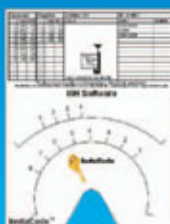
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2001 Kawasaki ZRX1200R



Helmet Lock

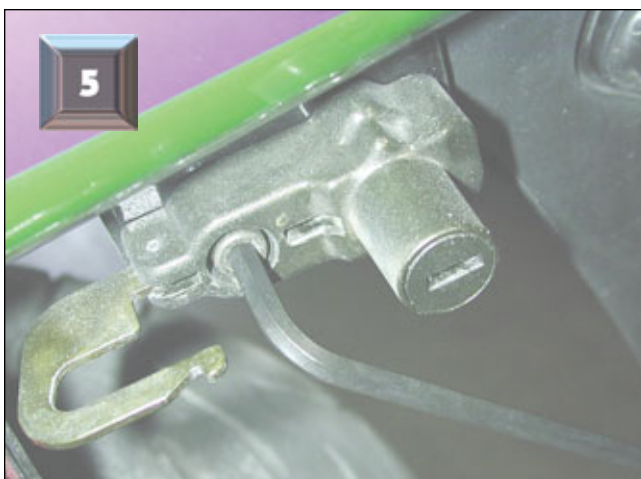
The ZRX1200R has an easily removed helmet lock with the code stamped on the back. So do the other models that use the KM-8 ignition lock except for the 2000+ ZX12R and 2002+ ZZR1200. We will cover key origination for both types and we will begin with this ZRX1200R.



The helmet lock is located on the left side of the motorcycle just in front of the left/rear turn signal. Pick it 45 degrees clockwise to unlock it. This lock picked easily with a rake and lubing can help.



The KM-8 ignition/steering lock first appeared on the 1999 Kawasaki ZRX1100. The 1999+ Kawasaki models that use this lock are the W650, ZR7, ZR7S, ZRX1100, ZRX1200, ZX12R and ZZR1200. The lock is shown in the OFF position. A slight turn clockwise turns the ignition ON and then you can push the plug in and turn it farther clockwise to P (parking lights on). To lock the steering, turn the steering all the way to the left or right, push the plug in, and turn it counterclockwise to LOCK. You do not have to push the plug in to turn it from LOCK to OFF or from P to ON.



Use a 5mm hex key to remove the one bolt that secures the helmet lock and remove it from the motorcycle.



The code is stamped into the backing plate. There are two sets of characters. The code is on the bottom and begins with the letter Z.



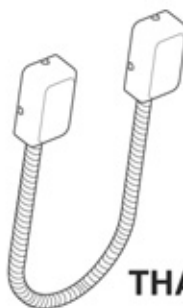
A close look shows that the code is Z5971.



A code cut KW16CP with cuts of 314211 turns all of the locks smoothly.



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9



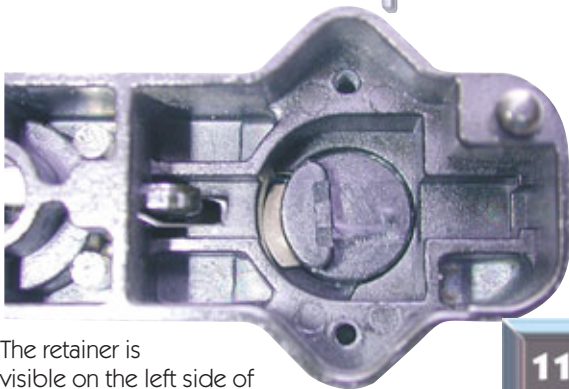
The two Phillips screws have been removed from the back of the lock housing. The shackle spring plate was removed and placed on the right. Then the backing plate was removed and placed on the left. You can now remove the bolt and spring.



10

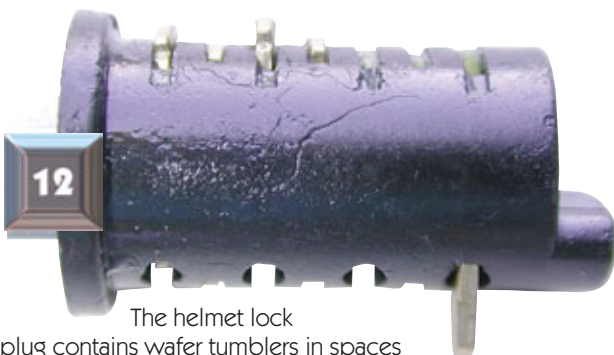


The bolt and spring have been removed from the lock housing.



11

The retainer is visible on the left side of the plug. Depress it and push the plug out the front. Be careful and do not allow any wafers to spring out.



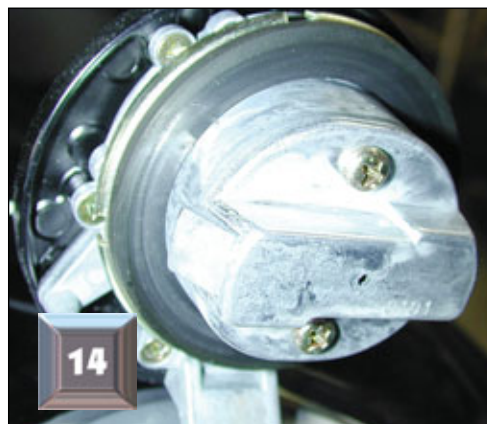
The helmet lock plug contains wafer tumblers in spaces 1-4 and a wafer retainer. A KW16CP blank inserted into the plug shows the cuts for the first four spaces are 3142. A software search revealed that there are seven codes that use these cuts in the first four spaces. You can also progress spaces 5-6 in the gas cap or ignition lock; there are 16 possibilities. The last two cuts turned out to be 11 so the first try turned the ignition lock.

Gas Cap Lock



13

The gas cap lock contains wafer tumblers in spaces 2-6. Pick it 90 degrees clockwise to open it. It usually picks easily with a rake and lubing helps. Have a small screwdriver ready to finish turning the plug against spring pressure. The keyway is wide open so reading the heights of the wafers should not be too difficult.



14

Remove the two Phillips screws from the bottom of the cap to disassemble it. The disassembly procedure is the same as the gas cap on the 2001 ZX12R in this article.

Seat Lock



15

The seat lock is located on the left side of the motorcycle just in front of the left/rear shock absorber.

Tumbler Locations:	1	2	3	4	5	6
Ignition:	.....X	X	X	X	X	X
Gas Cap:	.....	X	X	X	X	X
Helmet:	.....X	X	X	X		
Ignition:	.....1-6					
Gas:	.....2-6					
Helmet:	.....1-4					

2001 Kawasaki ZX12R Ninja



The ZX12R does not have a helmet lock so there are no codes anywhere on the bike but the key is not difficult to originate.



This view from the drivers seat shows two of the three locks on this motorcycle. The ignition/steering lock is between the instrument panel and handlebars. The gas cap lock is on top of the gas tank. The seat lock is on the left side below the back of the seat. It is behind plastic bodywork and is not easy to remove.

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Gas Cap Lock

Begin by picking the gas cap lock 90 degrees clockwise to open it; lubing helps if it is being stubborn. You are picking against spring pressure so have a small screwdriver ready to finish turning the plug. I usually like to remove the gas cap and take it to a workbench. It is not easy to remove this one so it is a lot faster to disassemble it on the bike.

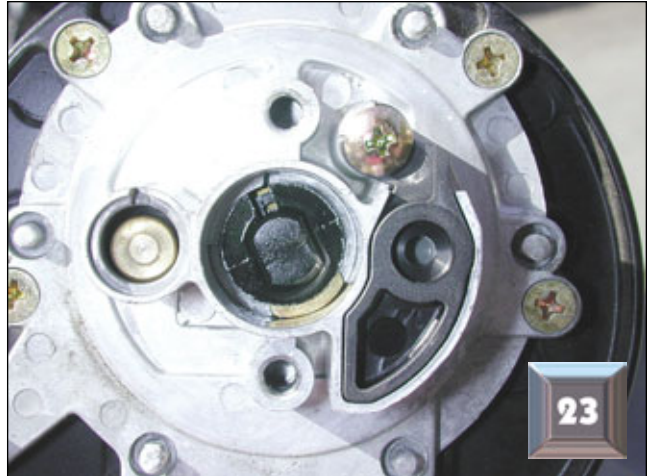


18

22

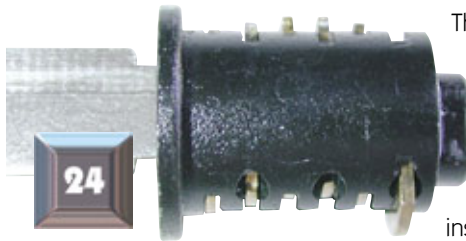


The six compression springs and both tailpieces have been removed.



23

Now the retainer is visible on the bottom side of the plug. Depress it and push the plug out the front of the cylinder. Be careful and do not allow any wafers to spring out.



24

The gas cap contains 5 wafer tumblers in spaces 2-6 and a wafer retainer. A KW16CP blank inserted into the

keyway shows that the cuts for the last 5 spaces are 12332. Cut a key that will turn the gas cap lock smoothly and then you will only need to progression the first space in the ignition lock. Notice that the key is tip stopped in the gas cap lock; it is shoulder stopped in the ignition lock.



19

The number on the bottom of the cap is not the code. Stuff a rag into the filler neck to prevent parts from falling into the gas tank. This is especially important when disassembling the gas cap while it is still attached to the gas tank.

Remove the two Phillips screws and remove the whole locking bolt assembly including the compression ring and gasket. These parts can come apart so hold them together and you should not have to reassemble them.



20

The locking bolt assembly along with the compression ring and gasket have been removed intact.

Remove the six compression springs and the two tailpieces. Use pliers to grip the outer tailpiece to pull it out, and then grip the inner tailpiece to pull it out.



21

25



A KW16CP with cuts of 112332 turns the locks smoothly. A reverse code search revealed that the code is Z5695.

Tumbler Locations:	1	2	3	4	5	6
Ignition:X	X	X	X	X	X
Gas Cap:	X	X	X	X	X
Ignition:1-6					
Gas:2-6					
Codes:Z5001-Z6000					
Blank:	Ilco KW16CP-SI, Silca KW16CP, Fuki M406					
Spacing:	1=.098, 2=.197, 3=.295, 4=.393, 5=.492, 6=.591					
Depths:	1=.258, 2=.238, 3=.218, 4=.199					
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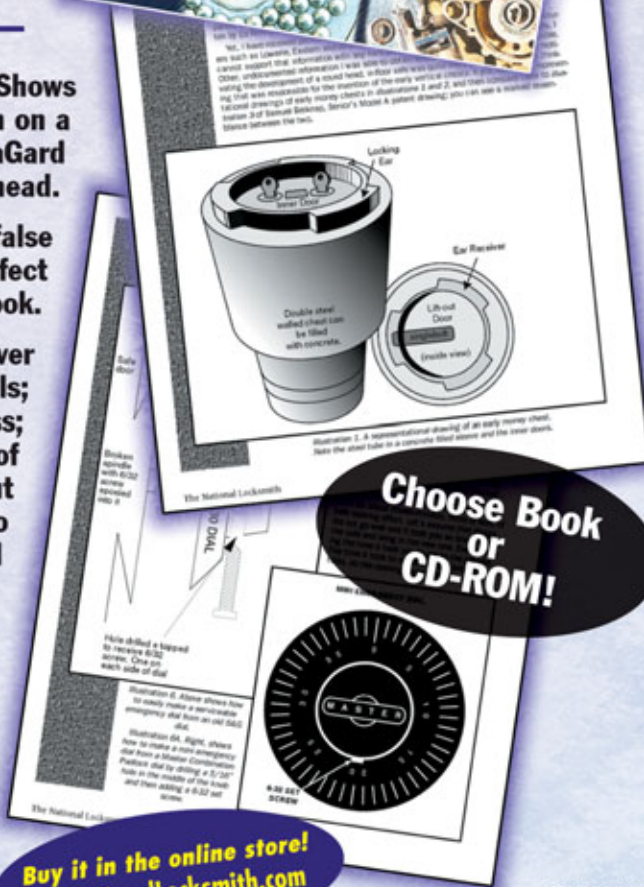
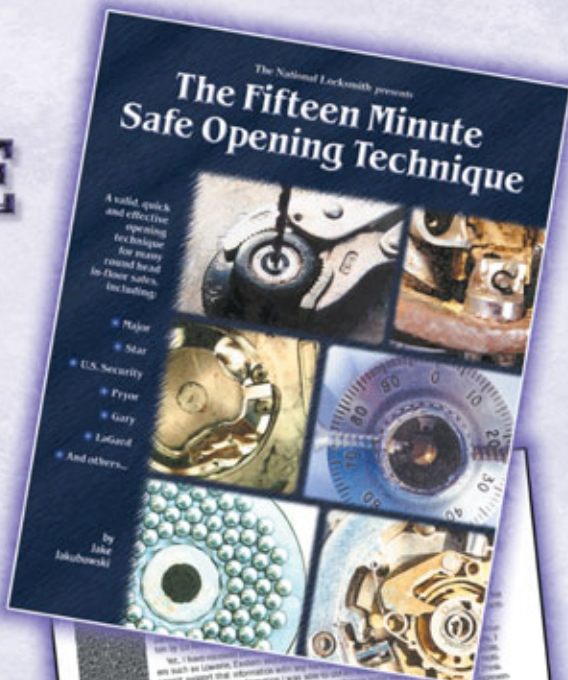
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The "Spin Out" by Keedex



If your experiences are like mine, you have had several nasty cuts on your fingers and hands from screwdrivers slipping and stopping only after inflicting damage. One of the biggest offenders for this type of injury has been loosening the setscrew on the back of mortise locks. They tend to twist and turn over and the screwdriver ends up in your finger.

The Tool:

Enter the Spin Out by Keedex. Its main purpose in life is to eliminate the before mentioned injury from mortise locks. The tool is very simple in its makeup and function. It is manufactured in the shape of a horseshoe with one leg for attaching the tool to the worktable and the opposite leg set up for the working part of the tool.

By working part, I mean the only moving part. This is comprised of a large knob (2-3/8" in diameter) that is attached to a shaft, which passes through a brass sleeve, and has its end made to fit a standard sized screwdriver bit. Any 1/4" bit will fit and several come with the tool.

Using The Spin Out:

To use the tool, simply place the mortise lock into the open horseshoe and lower the driver into the screw. The size of the knob makes for easy turning even in bitter cold weather with gloves on your hands. By turning the knob the screw is loosened and a quick spin will have the screw removed without a scratch or any blood to show for your efforts. If the screw is stripped, it is not a problem. You can exert a great deal of pressure on the screw by just pressing down harder on

the knob. There is no need to worry about the lock falling over since the screwdriver can only go so deep, approximately one inch from the base, and then the top of the horseshoe stops it.

Another advantage of the Spin Out is the cost of replacement of tips. When a regular screwdriver rounds out, it has to be replaced. When the Spin Out tip rounds out, all you replace is the tip. Money saved is money earned.

First Thoughts:

When I first received the Spin Out I had three concerns: Was it constructed heavy enough; how convenient would it be for easy usage; and would it be useful for other screw removal?

My first concern was soon diminished; the Spin Out is very substantial. All too often the opposite is true. We think we are getting a quality product only to find it to be too flimsy to use in the field. That is not the case with the Spin Out. This is a tool you will be able to use for years without any worry of it breaking.

As for convenience, I find if I am going to use a tool, it has to be convenient and readily available or I will not use it. I overcame the concern by mounting the tool on my workbench in my truck where I do 90% of my rekeying work. By having it where I can just reach a few inches to access it, I have found that I no longer use the loose screwdriver for this purpose. I might add that I have not had a single cut from a slip of a screwdriver removing a mortise screw, and I don't miss the pain.

I also soon found the Spin Out to be invaluable in loosening other very tight

screws that had proven to be difficult with a regular screwdriver. It seems the only limitation on the Spin Out is the size of the object from which you are trying to remove the screw. If it fits in the horseshoe, you can use the tool as it is intended.

I have even taken the tool one step further and have taken the driver out of the sleeve and utilized the large knob to give me better leverage on screws in objects too large to place in the horseshoe.

From A Practical Standpoint:

I need to be able to justify the tools I use in my own mind before I feel the investment was valid. With the Spin Out, the payoff is quick and easily discerned. Just the fact that I will not be working with the number of cuts on my hand is reason enough to buy this tool, but that is not the only benefit I have received. Not to mention the ease of screw removal, this tool works.

Recommendation:

I believe the Spin Out to be a quality tool that is a good purchase for any size shop. Get one for each workbench, as you will soon come to rely on its convenience and ease of use.

Price:

Suggested retail price for the Spin Out is \$39.95.

Contact Information:

Keedex, Inc.
12931 Shackelford Lane
Garden Grove, CA 92841
Phone: (714) 636-5657
Fax: (714) 636-5680
E Mail: Info@keedex.com
Web: www.keedex.com 

IN SUMMARY:

DESCRIPTION: The "Spin Out" is a Mortise cylinder screw removal tool.

PRICE: \$39.95

COMMENTS: Works even on stripped screws.

TEST DRIVE RESULTS: A quality tool that is a good purchase for any size shop.

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